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Handbook of Injurious Insects  
& Plant Diseases & How to  
combat them.

Bowker Insecticide Co.

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# HANDBOOK

of Injurious Insects and Plant  
Diseases and How to Combat them



**BOWKER**  
**INSECTICIDE**  
**COMPANY**

**BOSTON**  
**NEW YORK**  
**CINCINNATI**



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### TERMS, SHIPPING DIRECTIONS, ETC.

**TERMS.** The prices quoted in this catalogue are net for cash with order. Remittances should be sent by P.O. Money Order, Express Money Order, Certified Check, or by Registered Letter.

**SHIPPING DIRECTIONS.** Customers should give post-office address and nearest depot, and state whether the goods are to be sent by express or freight. All packages of less than fifty pounds weight should be ordered sent by express, to avoid delay and possible loss. If no instructions are given, our experienced shipping clerks will use their best judgment in selecting route and method of shipping. We deliver all goods free on board cars or boat at Boston, New York, or Cincinnati.

**ORDER IN SEASON.** While "rush orders" always receive our immediate attention, we would respectfully urge our customers to order at least a part of the necessary supply of insecticides in advance of their actual needs. Address all orders to

**BOWKER INSECTICIDE COMPANY**  
**43 CHATHAM STREET, BOSTON, MASS.**

# REMOTE STORAGE



## A "Bodo" Object Lesson.

Mr. C. M. Dawkins, of Dorchester, Mass., who raised the sprayed quinces shown at the right in the above photograph, says: "Previous to last season my quinces were annually spoiled by rot when the fruit was half-grown. Last year I sprayed them thoroughly with Bowker's Bodo, and as a result they were as sound and fair as any one could wish."

**T**HE HON. WILLIAM R. SESSIONS, ex-Secretary of the Massachusetts Board of Agriculture, writes: "I applied Bowker's Boxal to my potatoes. It killed the bugs, and I had a fine crop, without a sign of blight or rot, although both were prevalent in the vicinity. I used Pyrox for the elm-leaf beetle, with perfect success. The Tree Soap proved effective in destroying plant lice on my young fruit trees, and it was evidently an advantage to the trees otherwise, leaving them clean and thrifty."

## **CROP INSURANCE.**

**A WORD DIRECT.** You have a farm, orchard, or garden from which you are trying to get profitable crops, but in a night insects or blights may convert real profit into actual loss, and leave but little to show for your thought and labor.

**KNOWN REMEDIES.** For nearly thirty years our experiment stations have been studying these pests and seeking means to destroy them. Scientific remedies have been discovered, but they are often so complex in their nature, or so difficult to prepare with the facilities at hand on a farm, that they have not come into general use.

**PREPARED INSECTICIDES.** Knowing the merits of these official remedies and the difficulties in making them at home, two years ago we began their manufacture, based on formulas endorsed by Government Experiment Stations, and put up in convenient form for immediate application. Practical farmers have found their use immensely profitable.

**SCIENTIFIC BASIS.** Each preparation offered by this Company therefore has a sound, scientific basis, as well as proved practical value, and if properly applied will give complete satisfaction. These goods are chiefly put up in paste form, and only require the addition of water. Thus all the tedious details of weighing, dissolving, straining, mixing, etc., are eliminated. All that is necessary is to dilute and spray.

**INSURE YOUR CROPS.** You insure your buildings against the ravages of fire. You can as easily insure your crops against the ravages of insects or blights by using Bowker's Germo-Insecticides. Timely spraying with these goods will give you large crops of high quality. You pay a small premium to have your buildings insured. Is it not sound policy to invest a small amount in reliable crop insurance?

**IT PAYS.** Two years ago Hall & Cole, Faneuil Hall Market, Boston, Mass., sold apples from sprayed trees at \$7.00 per barrel, when apples from unsprayed trees did not bring over \$1.50 per barrel.

Last year Irving & Ricker, Caribou, Me., sold potatoes in the Gloucester (Mass.) market at 15 cents per barrel *above* the market price. These potatoes were from fields thoroughly sprayed with Bowker's Bodo, and hence were free from rot. The buyer knew of their superior keeping quality, and was willing to pay for it.

Mr. W. I. Chamberlain, Hudson, Ohio, used Bowker's Disparene on his apple orchard, and made a net profit of \$1,600 on his 1901 crop. In the *Ohio Farmer* of December 12, 1901, he writes: "But for spraying I probably should not have got \$200 for my apples this year." We might fill this book with records of similar instances.

**FOR REFERENCE.** If you grow crops of any kind, or even if you have but a kitchen garden, it will pay you to read this handbook carefully. Time is precious when insects or blights attack your crops, and in such emergencies this book may prove invaluable.

If consultation of this book does not give you all the information you desire, we shall be glad to answer any questions which may arise and to advise you, free of charge, whether you patronize us or not.

## **BOWKER INSECTICIDE COMPANY, 43 Chatham St., Boston, Mass.**

**Successor to**

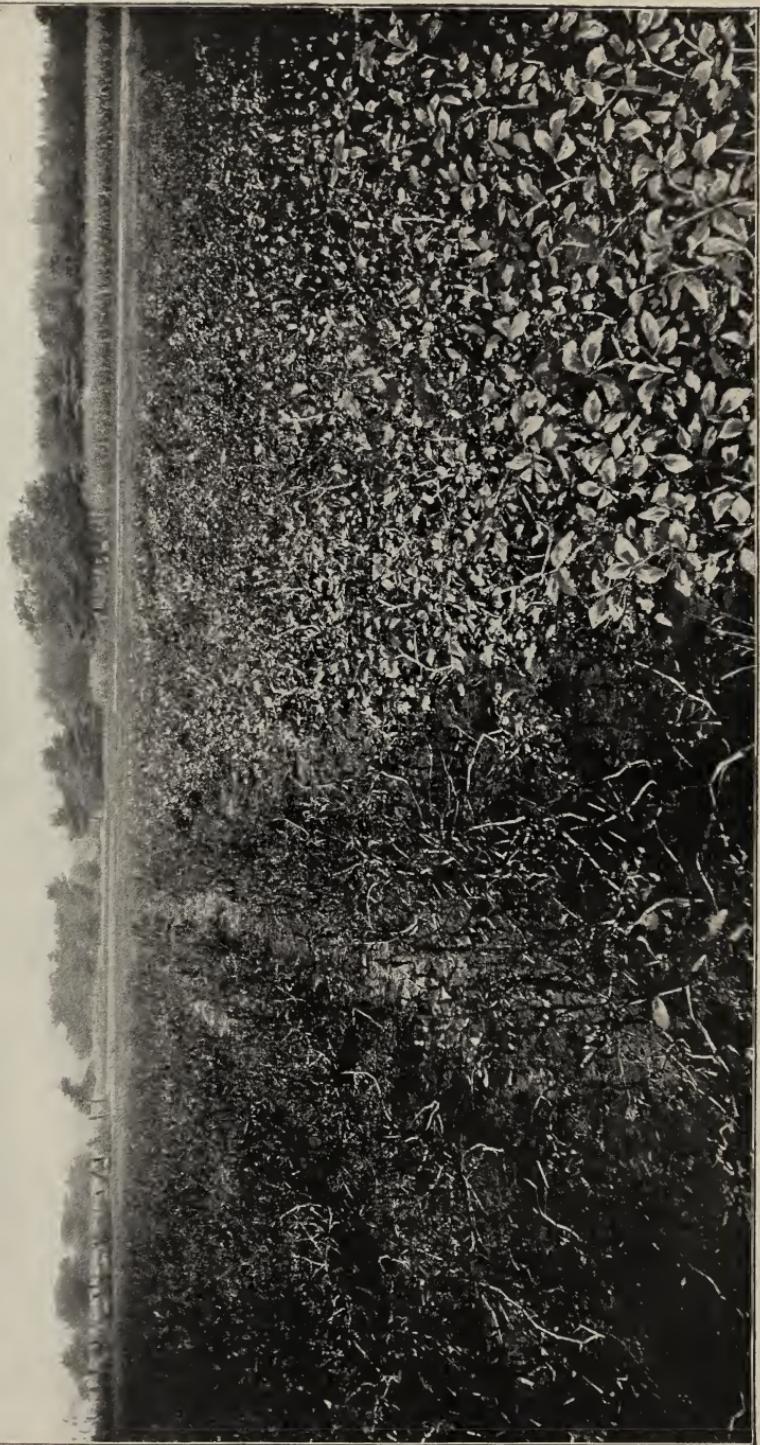
**BOWKER CHEMICAL COMPANY.**

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**P**ROF. M. V. SLINGERLAND, Entomologist Cornell University Experiment Station, Ithaca, N.Y., writes: "I used your insecticides and combined insecticides and fungicides, and found them very effective. It is delightfully convenient to have the material all mixed, 'on tap,' so to speak. I did not see that the mixtures deteriorated after the packages were opened. Therefore I am entirely satisfied and delighted with the materials, and shall recommend their use."

### How Bowker's "Boxal" protects Potatoes, keeps them Green, and lengthens the Growing Season.

In the above photograph the vines on the left were not sprayed, while those on the right were sprayed three times during the growing season with Bowker's Boxal, a substitute for both Paris green and Bordeaux Mixture. Mr. H. Allen Sheldon, of Wilmington, Mass., who raised these potatoes, writes: "The seed, quantity of fertilizer, and cultivation were identical for both plots. The only difference in treatment was the spraying of half the piece. The unsprayed vines blighted early in August, and the tubers rotted. The sprayed vines kept green, and grew *three weeks longer*, and yielded a good crop of potatoes free from rot."



For Potatoes.

## **BOWKER'S "BOXAL."**

### **Prolongs the growing season and increases crop.**

Bowker's Boxal is a fungicide and insecticide in one. As a fungicide it prevents the attack of rust, thus keeping the vines green and growing from three to four weeks longer than where it is not used. By lengthening the growing season it increases the crop both in quantity and quality. It also prevents rot, and in that way insures a large yield of sound tubers.

Boxal accomplishes three things at one operation,—it kills the potato bugs, checks blight or rust, and prevents rot. It is better and cheaper than Paris green, which kills the bugs *only*, leaving the vines exposed to blight and rot. By using Boxal you not only kill the bugs, but prepare the vines *in advance* to withstand the sudden attack of blight and rust, thus increasing their productive power.

*Remember*, Boxal sticks to the vines and keeps them green, lengthens the growing season from three to four weeks, and hence greatly increases the yield. It is manufactured from purest chemicals and put up in the form of paste, possessing all the valuable properties of freshly made mixtures.

It mixes evenly in water and does not clog nozzles which give the finest spray. It is never applied dry, but diluted at the rate of ten pounds to fifty gallons of water. It is important to apply Boxal early in the season, before the slugs are thick.

To secure the best results we recommend three sprayings during the season, to keep pace with the new growth of the vine. Full directions accompany each package.

5	pound	can,	\$0.50
10	"	"	1.00
25	"	"	2.25

50	pound	keg,	\$4.25
100	"	"	8.00

### **From High Authority.**

Prof. GEORGE T. POWELL, Director School of Practical Agriculture and Horticulture, Briarcliff Manor, N.Y., writes: "We found the Boxal you sent to be excellent. It is thoroughly effective, and when used on potatoes it adheres for a long time. A slight rain does not diminish its effect on the insects."

M. I. WHEELER, Esq., Great Barrington, Mass., writes: "The use of your Boxal last season was wholly satisfactory. I think it prevented blight, and know it saved my potatoes from destruction by bugs. I shall have no further use for Paris green for that purpose."

### **Serves a Double Purpose.**

Hon. J. M. DANFORTH, Lynnfield Centre, Mass., writes: "The Boxal you furnished me is better than anything I ever used on potatoes. It is easy to apply, and not only kills the bugs, but keeps the vines healthy and green."

Mr. BENJAMIN SMITH, Washington County, N.Y., writes: "I did not get the Boxal in time to apply it on my early piece of potatoes, so used Paris green; but it did not kill the bugs, and the first thing I knew the vines were nearly stripped. I then applied Boxal, and, to my surprise, the vines began to leaf out again, and a second application did the business for the season. I left part of the piece untreated as a check, and I found that the Boxal will prevent rot to a marked degree. On a second piece of potatoes I used Boxal exclusively, and they did not rot, and kept green until the first frost."

A. H. NICKERSON, Penobscot County, Me., writes: "I used Bowker's Boxal on my potatoes, and was well pleased with its effect and the benefit derived. It serves two purposes,—destroys the bugs and preserves the tops. I shall use it again another season."

### **Lengthened Growing Season Four Weeks.**

Mr. GEORGE W. WHEELWRIGHT, Jr., Worcester County, Mass., writes: "We had great success in keeping our potatoes growing and vines green much longer than our neighbors, by using Boxal, made by the Bowker Chemical Company. We found vines treated with Boxal lasted four weeks longer than those not treated."

Mr. J. A. STANTON, New London County, Conn., writes: "I used Bowker's Boxal twice on my potatoes, and the result was that the vines kept green until the tubers ripened. The potatoes were large and of most excellent quality."

Mr. J. W. TURNER, Chester County, Pa., says: "Because of the rainy season I only gave my potatoes one application of Boxal, but that killed the bugs and kept the tops green much longer than my neighbors' who only used Paris green. My potatoes averaged larger than my neighbors'."

### **Sure Death to Bugs.**

Mr. W. E. GOWDY, Atlantic County, N.J., writes: "The Boxal is sure death to potato bugs. I had millions of them, but Boxal killed them, leaving the vines bright and vigorous."

Mr. N. A. ADAMS, Worcester County, Mass., writes: "I have been very much pleased with the results from using your Boxal, and like it very much. After applying it, there were no more bugs on my potatoes and no blight. I had the best crop in the neighborhood, and think your Boxal is largely responsible for it."

Mr. A. N. COSNER, Sussex County, N.J., writes: "Your Boxal surely 'boxes' the bugs; and the way it sticks to the vines, rain or shine, is wonderful. It is perfectly satisfactory."

### **No Rot here.**

Mr. C. D. KENYON, Washington County, R.I., writes: "I used your Boxal on potatoes, and found it destroyed the bugs. At digging time there were no signs of rot. I shall use it another season."

Mr. W. P. FOGG, Essex County, Mass., writes: "I found your goods exactly as represented. The Boxal was used with entire satisfaction. I used it extensively on my potatoes to kill bugs and prevent blight and rot, and when I dug them I had an excellent yield of tubers of good quality."

### **Valuable for Dahlias and Egg-plants.**

Mr. B. F. FLANDERS, Middlesex County, Mass., writes: "The Boxal you sent me was very effective against the potato blight. It is also one of the best remedies for dahlia blight. I used it freely in both cases, and was more than pleased with the results, and shall take pleasure in recommending it to dahlia fanciers and potato growers."

Mr. J. T. ALLINSON, Mercer County, N.J., writes: "We found your Boxal effective when applied to potato plants. On egg-plants, even with our crude appliances, we found it to be the best insecticide we have used, preventing injury by blight, scald, or bugs."

## **Effective and Cheap.**

Mr. J. G. BUCHANAN, Holmes County, Ohio, says: "The Boxal I purchased from you answered every purpose of the Bordeaux Mixture and Paris green. I am pleased to know that I can buy it already prepared cheaper and better than I can make home-made mixtures. I can also avoid the cost of labor and the annoyance."

Mr. P. H. REED, a well-known grower of seed potatoes at Fort Fairfield, Me., says: "The three cans of Boxal you sent were used beside my own mixture, and I consider it very effective in preventing rust and very easily mixed with water. I also consider it equally as effective in killing the bugs, and more lasting than Paris green."

## **Kept the Vines Green.**

Miss ELLEN ROCKWELL, Middlesex County, Conn., writes: "I obtained the Boxal too late for use on early potatoes, but a few late ones on which I used it *are still fresh and green* (October 3), notwithstanding the exceptional drought of the summer."

CHARLES M. PARKER, Middlesex County, Mass., writes: "One piece of potatoes, where Bowker's Boxal was not used, was struck with a blight. The piece where the Boxal was used was not affected."

D. C. KENYON, Washington County, R.I., writes: "I used Boxal on my potatoes, and think it a good thing. It is safe to use, and does not scald the vines, like Paris green. The sprayed vines were green when others of my neighbors' were dead."

## **Boxal Sticks.**

Mr. J. A. D. STRACK, Lebanon County, Pa., says: "The Boxal gave excellent results. It is easy to apply and beats Paris green, as it lasts longer on the vines. It keeps the vines green for a long time."

Mr. M. E. MARVEL, Bristol County, Mass., writes: "I used your Boxal, both on potatoes and on trees, to destroy insects and prevent blight. The results were perfectly satisfactory,—in fact, better than I expected. I had the best crop of potatoes this year that I ever raised, and Bowker's Insecticides did it."

## **From a Well-known Lawyer.**

Mr. ELLIOTT MARSHALL, New York, writes: "We are very much pleased with the results obtained from using your Boxal. Our potatoes have done very well this year."

## **Doubled the Yield.**

Mr. CHARLES WATERMAN, Knox County, Me., writes: "I used your Boxal on my potatoes last season. Where I used it the yield was twice as large as where it was not applied. I am completely satisfied with it, and will use a large quantity next season."

## **Boxal gives Big Returns.**

Mr. H. H. TERWILLIGER, Muskegon County, Mich., writes: "I was very much pleased with the Boxal, and, if I could have obtained more of it in season, it would have saved us five hundred bushels of potatoes."

## **Best Crop in Vicinity.**

Mr. J. F. OTIS, Norfolk County, Mass., writes: "I used your Boxal on three-quarters of an acre of potatoes, applying it as directed. This being a poor year for potatoes, and the rot so abundant, some of my neighbors found it did not pay to dig their fields; but from my little field I took one hundred and seventy-eight bushels. This experience has been a great surprise to both my neighbors and myself. I shall use Boxal, and more of it, next year."

### How Bowker's "Pyrox" kills Caterpillars.

The photograph on the left shows a lively nest of full-grown tent caterpillars, feeding on the wild cherry; while that on the right shows a nest of these caterpillars of the same age, that have been killed by spraying with Bowker's Pyrox.



## BOWKER'S "PYROX."

### For Fruit Trees. Serves a Double Purpose.

This compound does for fruit trees what Boxal does for potatoes. It destroys the codling-moth, canker worm, tent caterpillar, and allied pests, and at the same time prevents damage by the apple scab and pear blight. On stone fruits it checks damage by curculio and black knot, and prevents injury by the brown rot and leaf curl. On grapes it prevents injury by the grape-root worm, hinders the attack of the rose chafer, and prevents mildews and rot. As it does not injure the foliage, it may be applied to the tenderest vegetables to prevent damage by blights or leaf-eating insects.

These are but a few of its uses. It may be *safely* applied to all fruit trees, shrubs, or vines, as a substitute for Bordeaux Mixture and Paris green, which often burns.

Pyrox possesses all the merits of Bordeaux Mixture combined with a *safe* yet powerful insecticide. It is a valuable remedy for insect pests and for mildew, scab, rot, rust, etc., thus serving a double purpose.

Bowker's Pyrox is probably the safest and most practical combination of an insecticide and fungicide ever offered to fruit growers. *It is not an experiment.* It has been used by prominent horticulturists and gardeners, whose testimonials speak for themselves. It is put up in concentrated paste form in sealed cans, and applied at the rate of ten pounds to fifty to sixty gallons of water. Explicit directions with each package.

5 pound can,	\$0.75	50 pound keg,	\$4.75
10 " "	1.25	100 "	9.00
25 " "	.50		

### Results tell the Story.

Mr. R. K. LONG, River Styx, Ohio, writes: "For some seven years I have been spraying my small orchard of one and one-half acres, using home-made Bordeaux Mixture and Paris green, but always had some wormy apples. Last year I applied your Pyrox according to directions. The result was wonderful. My Early Richmond cherries and plums, always wormy heretofore, were free from worms. My Early Transparent apples were perfect, and brought 25 cents a bushel above the market price. I had upwards of two hundred and fifty bushels of perfect choice winter apples. When marketed, they were taken fast, because there was nothing like them in the county. This fruit was entirely free from worms, smooth, and high colored. The results were remarkable for an 'off year,' and were due to Bowker's Pyrox."

### Fine Fruit from Pyrox.

Mr. CHARLES E. SMITH, Pike County, Ohio, writes: "We sprayed our apple trees three times with your Pyrox, with the exception of one tree. This tree had but a few inferior apples. The sprayed trees bore all they ought, and the fruit was of fine quality."

## **Big Results on Plums.**

Mr. W. H. BOYD, Burlington County, N.J., says: "The Pyrox I obtained from you last spring was a great success. I used it according to directions, and found it easy to mix and that it did its work completely. Last year I had my first crop of plums set, but the insects destroyed the entire crop. This year my trouble was to save my trees from breaking down with their load of fruit. I had to spend considerable time in propping them up with poles. I shall continue to use Pyrox."

Mr. WILLIAM CHARLTON, Allegheny County, Pa., writes: "I found your Pyrox the best preparation I ever used on fruit trees. I sprayed my plums and cherries with it, and as a result had a full crop. It is the easiest preparation to mix I have ever used."

## **Effective and generally Useful.**

Mr. W. S. RAY, Clinton County, Pa., says: "The Pyrox I obtained from you gave excellent results. A Maiden Blush apple tree over twenty years old, which has never borne a sound apple, was thoroughly sprayed with Pyrox. As a result every apple was a sound, large one, free from injury by insects or scab. I found it of great benefit to plums, grapes, and currants. It killed potato bugs quickly, and, applied to blackberries afflicted with rust, gave excellent results."

## **Does Double Duty.**

Mr. H. A. HARRINGTON, Peabody, Mass., writes: "The Pyrox worked all right on my fruit trees: it killed the canker worms and especially stopped the blight."

Mr. D. H. BELCHER, Norfolk County, Mass., says: "Apples were a very scarce article here this year, and the trees sprayed with your Pyrox were about the only ones in the neighborhood yielding a crop."

## **Saved the Strawberries.**

Mr. THOMAS R. HUNT, Hunterdon County, N.J., writes: "I saved a small strawberry patch from destruction by the shot-hole fungus by the use of Bowker's Pyrox."

## **Easily Prepared.**

Mr. WILLIAM E. GOWDY, Atlantic County, N.J., writes: "I found Pyrox excellent in results on the apple, peach, grape, and other fruits. It is handy, clean, effective, and can be prepared in a few moments."

Mr. OSCAR STAPLES, Hancock County, Me., says: "I never found anything so easy to apply, and so effective in results on apples, plums, and small fruits, as Bowker's Pyrox. My experience was entirely satisfactory."

## **Kills Currant Worms.**

*American Gardening* of May 18, 1901, says: "Currant worms, always an annoyance to be guarded against, are almost instantly destroyed by the use of Pyrox. It is more easily applied than hellebore, and the number of testimonials that we have received in favor of Pyrox for killing currant worms is very flattering for the manufacturers."

A well-known Maine farmer, H. B. COOLIDGE, Franklin County, says: "I never used anything on currant bushes that I liked so well as Bowker's Pyrox. It was effective, and not a currant worm did I have after one spraying until late in the fall, when the fall brood appeared. They were treated the same as the first lot, with the same good results."

Mr. A. M. WILLEY, Windsor County, Vt., says: "I used your Pyrox on fruit trees of all kinds with perfect satisfaction. I also used it for currant worms, and it caused them to leave the bushes in quick order."

### Valuable on Apricots.

Mr. GEORGE W. PERRY, Grand Isle County, Vt., says: "The Pyrox gave good satisfaction wherever tried. I found it especially satisfactory on apricots, for which I particularly wanted it. It was also excellent on potatoes."

### Death to Codling-moth.

Mr. E. C. BUTTERFIELD, Middlesex County, Mass., writes: "I found the Pyrox O.K. One thorough application will completely destroy the codling-moth and other insects, besides greatly improving the fruit."

### Pyrox brings Prizes.

Mr. L. W. LEACH, Middlesex County, Mass., says: "I sprayed my orchard twice thoroughly with Bowker's Pyrox, and at the Brockton Fair I won first prize on Rhode Island greenings, first prize on McIntosh reds, first prize on Roxbury russets."

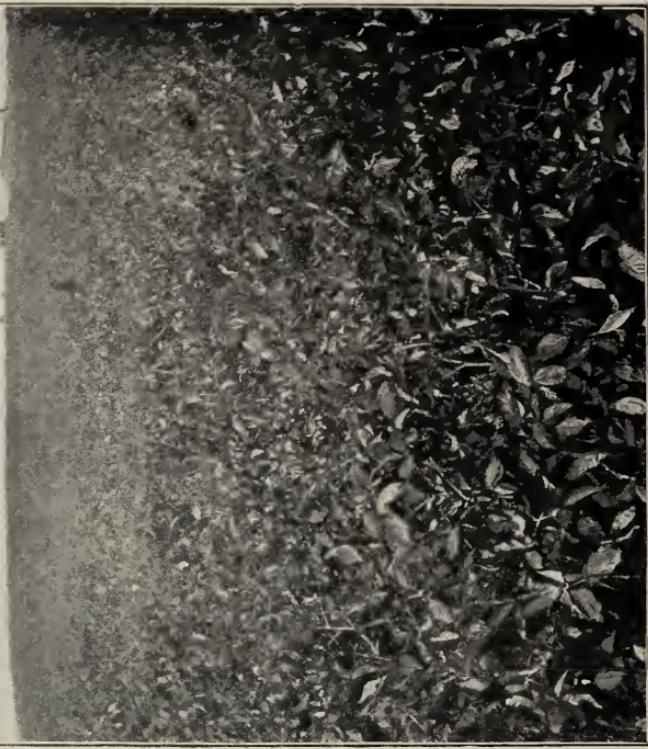
Mr. E. F. Jennison, Hartford, Conn., writes: "At the Wethersfield Fair I exhibited eighteen varieties of apples, grown on my Lancaster (Mass.) place, and took first premium. Although this is an off year for apples, I had about one hundred and seventy-five barrels, and sold the winter fruit to a large buyer, who said they were the finest apples he had ever seen grown in that vicinity. I attribute this result to the liberal use of Bowker's fertilizers and to the fact that I gave the trees two sprayings with Pyrox. My orchard was the only one in the whole vicinity that bore a crop."



### Perfect Fruit.

Golden Russets sprayed with Bowker's Pyrox.

Mr. C. S. Phinney, the well-known orchardist of Standish, Me., who raised these apples writes: "For two years I have used Bowker's Pyrox in my orchard with profitable results. It prevents damage by the codling-moth and other insects, and kills canker worms in short order. I have had much experience in making spraying preparations, but find Bowker's Pyrox much handier and easier to mix and apply than any home-made mixtures."



Sprayed with Bodo.



Not sprayed.

Both of these photographs were taken September 10, and show two adjoining fields of potatoes at Caribou, Me. Both fields had been planted at the same time with the same variety of seed. Both were treated alike, except that the one on the right was sprayed with Bowker's Bodo, which prevented blight, and kept the vines bright and green four weeks longer than the unsprayed field, the tubers thus gaining growth and increasing the yield.

### How Spraying pays.

*A New "Bordeaux."*

## **BOWKER'S "BODO."**

Prevents blight, rust, scab, rot, and other fungous diseases of fruits or vegetables. No fungicide has been so extensively used as the Bordeaux Mixture for combating vegetable parasites which affect the growth of useful plants. As yet but a small proportion of our farmers are using this valuable preparation. There is little doubt that the chief barrier standing in the way of a more general use of Bordeaux Mixture is the trouble and uncertainties involved in preparing it on the farm.

The ingredients used in making it must be pure. They must be weighed out with exactness, and dissolved, strained, and mixed with care. Even then, lumps, grit, and dirt are often found present, and clogging of the nozzles results.

Bowker's Bodo is a perfect mixture of great strength, being carefully made by a competent chemist. Special attention is paid to freeing it from coarse particles. The ingredients are repeatedly filtered, and the finished product is *mechanically* and *chemically* perfect.

It is recommended for use against blights, rusts, mildews, etc., and in all cases as a substitute for home-made Bordeaux Mixture.

It is put up in the form of a concentrated paste, and is made ready for use by the addition of the proper amount of water. It is applied at the rate of ten to twenty pounds to fifty gallons of water. Full directions with each package.

5 pound can,	\$0.50	50 pound keg,	\$3.75
10 " " 1.00		100 " " 7.00	
25 " " 2.00			

### **Bodo doubled the Crop.**

ALEXANDER LOWRY, Monticello, Me., writes: "I am at a loss to find words with which to do justice to Bowker's Bodo. I used four hundred pounds of Bodo on sixteen acres of potatoes, and as a result the vines grew until killed by frost. The potatoes were large, sound, and of fine quality. Bodo doubled my crop."

MR. M. B. TEMPLE, Limestone, Me., writes: "Last season I made two applications of Bowker's Bodo to thirty-nine acres of potatoes, leaving one acre unsprayed. On this acre over half the potatoes were rotten, while on the sprayed field nearly the whole crop was sound and of good quality, the tops remaining green until late in the season. From this experience I think very highly of the Bodo, and shall use it three or four times next year."

### **Bodo is Handy and Effective.**

The well-known potato grower, H. EDBLAD, of Houlton, Me., writes: "I am now harvesting my crop of potatoes, and have an excellent yield and no rot. Would like to tell you my experience with the Bodo I bought of you. I planted forty-five acres to potatoes. I bought of you one ton of Bodo. I began spraying when first leaves were found sufficient to hold the spray. I sprayed four times at intervals of eight to ten days. First time I used twelve pounds of Bodo to fifty gallons of water per acre; second time, sixteen pounds Bodo; third time, twenty pounds; and fourth time, twenty five pounds per acre.

## **Nearly doubled the Crop.**

Mr. S. W. TABOR, of Washburn, Me., writes: "I used Bowker's Bodo last season, and the result was that on a row of potatoes thirty-five rods long, that I sprayed, I got within one and one-half bushels of double the potatoes that I did on a row that was not sprayed. I shall spray all my potatoes next year."

Mr. WALTER S. BAILEY, of Caribou, Me., writes: "I used Bodo last season, and I am quite sure that it nearly if not quite doubled my crop of potatoes. There was no rot where Bodo was used, while where I did not use it my potatoes were very rotten, having been killed early by rust."

## **Valuable for Violet Mildew.**

Miss H. E. HARRINGTON, Westchester, N.Y., writes: "I used your Bodo on my violets, and they responded so satisfactorily to the application that but one spraying was necessary to give perfect results."

## **Prevented Grape Rot.**

The J. M. Cahoon Company, large grape growers at Dover, Ohio, write: "We sprayed our grapes with Bowker's Bodo, with good results. From a vineyard of Moore's Early we harvested but one hundred and forty baskets in 1900, because of damage by mildew and rot. In 1901 the same vineyard, well sprayed with your Bodo, yielded about four thousand baskets."

## **High Praise from Aroostook.**

Mr. H. C. RICHARDSON, of Fort Fairfield, Me., writes: "Where I applied Bowker's Bodo thoroughly, it increased my crop of potatoes one-third, and the quality was very much better. You may use this statement as you see fit."

## **Bodo and Stockbridge a Strong Combination.**

Mr. H. W. BLAISDELL, Fort Fairfield, Me., writes: "I used your Bodo Mixture on potatoes this season, and am very well satisfied with the results obtained. I applied it on a twenty-acre field, except on parts left for experiment, applying it three times and using from seven to eight pounds to the acre each time. On one plot untreated I harvested on one row three baskets of potatoes, part of them rotten. From a row alongside, treated, five baskets of sound ones were harvested. The tops on the untreated plot died two weeks before those which were treated.

"On another plot, untreated, I could not see much difference in the tops from those which had been treated, as they both remained green until killed by the frost; but on digging I found the difference, there being five baskets of potatoes in the row treated and four in the row untreated.

"I also used on the field nine hundred pounds of Stockbridge Fertilizer to the acre, and harvested one thousand seven hundred and eighteen barrels of sound potatoes. In my opinion, the farmer who uses Bodo Mixture and Stockbridge Fertilizer will be sure to be pleased with the results, for they make a strong combination."

"I am fully satisfied that spraying has given me a return of four dollars for every dollar paid out. The last spraying I did I was obliged to hire a party to do the labor, as I was busy haying. This party had been using home-made Bordeaux on his own fields, and remarked how much better your Bodo worked through the nozzles than the mixture he had been using.

"I am a firm believer in Bowker's goods, and shall want more next season."

### Kept the Tops Green.

Messrs. KNAPP BROTHERS, Portage County, Ohio, say: "The Bodo bought from your house proved entirely satisfactory. Where used on potatoes, the tops remained green until the frost killed them. The yield was a good one, and the tubers large and fair."

Mr. A. E. SPOFFORD, Rockingham County, N.H., says: "I applied your Bodo once on a portion of my potato field with marked benefit, and am confident it would have more than paid me to have given all my potatoes three applications of Bodo."

### No Blight where Bodo was used.

From the well-known firm of IRVING & RICKER, Caribou, Me., we have the following: "We used Bowker's Bodo as follows: we sprayed all the potatoes twice, but when going over them the third and last time the spray gave out about twenty rods from the end on four rows. Two weeks later these unsprayed potatoes began to show signs of rust and then blighted badly, while the rest of the field never showed the least signs of rust until killed by frost.

"At digging we got one and one-half times the potatoes from the sprayed vines that we did from the unsprayed, and one-third of the potatoes that were taken from the unsprayed portion were rotten, while there was no rot on the rest of the piece."

### Prevented Blight and Rot.

ARTHUR WILLY, Aroostook County, Me., writes: "I sprayed my potatoes three times with Bodo, using seven pounds per acre each time, and leaving one row which I did not spray. This row died from rust, and very much earlier than those that were sprayed.

"When digging I took from the unsprayed row six and one-half bushels of market potatoes and one bushel small and rotten. From the same length on the adjoining sprayed row I took eleven bushels of market potatoes and one bushel small, but no rotten ones."

ISAAC KEARNEY, Aroostook County, Me., says: "I used Bowker's Bodo on my potatoes, leaving two rows that I did not spray. Four weeks before the harvest the two rows were killed by the rust, the rest of the field remaining green until killed by frost."

### Valuable on Asparagus.

MR. L. B. SMITH, Bridgewater, Mass., writes: "I used your Bodo on asparagus the past season, and found that it came up to your recommendations, both in ease of application and results. I can save labor and time by using it."

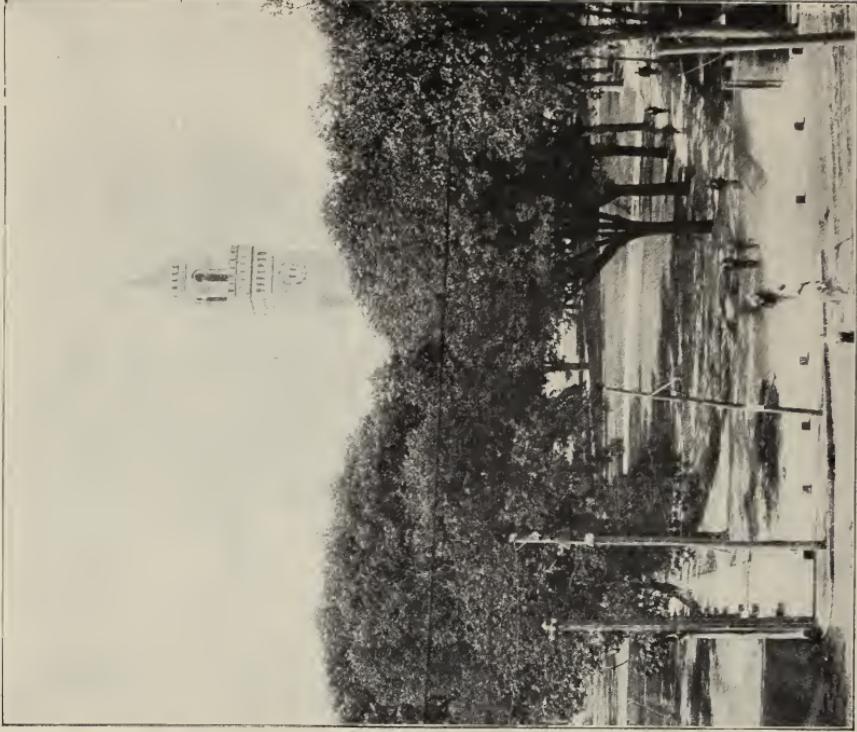
### Checked Cucumber Blight.

MR. C. W. STATLER, Richland County, Ohio, says: "We used your Bodo on cucumber and other vines, and found it very effective. It is in convenient form and easy to apply."

From *The Rural New Yorker*, June 23, 1900: "We have tried the prepared insecticides made by the Bowker Chemical Company. The Bodo is a perfect substitute for home-made Bordeaux, while Boxal certainly does the work expected from Bordeaux and Paris green mixed."

## How "Disparene" saves Trees.

The photograph on the left shows a large elm at Jamaica Plain, Boston, which had been defoliated by the elm-leaf beetle; while the photograph on the right shows elms on Worcester Common, Mass., which have been protected from the ravages of this insect by spraying, with Bowker's Disparene. Hon. JAMES DRAPER, Secretary of the Worcester Parks Commission, writes: "In our spraying operations we used Bowker's Disparene, which was very effective when properly applied. The most infested elms were sprayed first, and the foliage was well preserved."



*For the Elm-leaf Beetle, etc.*

## **BOWKER'S "DISPARENE"**

**Or Arsenate of Lead.**

*It "Sticks like Paint."*

Disparene kills all leaf-eating insects,—elm-leaf beetle, canker worm, codling-moth, tussock moth, cranberry fire-worm, cut worms, brown-tail moth, gypsy moth, potato bug, and similar insects. Disparene is our trade name for a very concentrated arsenate of lead, and is much superior to the ordinary so-called arsenate of lead.

Disparene is safer than any other arsenical insecticide; kills the insects, does not burn the leaves, and sticks like paint throughout the season. Disparene is the only arsenical insecticide known that can be safely used at any strength on the most delicate foliage.

It is probably the most effective poisonous insecticide that has ever been discovered for leaf-eating insects. It has never failed to destroy insects showing the greatest resistance to mineral poisons, and for many insects where other remedies have failed this has proved a specific. This is particularly true in the cases of the gypsy moth, canker worm, elm-leaf beetle, and grape-root worm.

The complete insolubility of Disparene renders it safe to apply to foliage at any desired strength, *without burning or scorching*. It is invaluable for use on cranberry and grape vines and on peach and plum trees, whose delicate leaves preclude the use of Paris green.

In all cases it may be safely substituted for Paris green, which often injures the foliage. On once becoming dry it adheres firmly to the leaves, and is not materially washed off by heavy rains. A spring application is often effective against insects appearing in the fall.

Disparene remains suspended in water with a very little agitation, thus affording an even spray, and its presence is shown by its white color on the foliage. It is now generally used in the leading parks and orchards of the East and wherever it is necessary to spray valuable trees or shrubbery.

Disparene is mixed with water at the rate of three to six pounds to fifty gallons, and applied as a spray. Full directions with each package.

2 pound can,	\$0.50	25 pound can,	\$4.25
5 " "	1.00	50 " keg,	8.00
10 " "	1.80	100 " "	15.00

### **From a Leading Entomologist.**

Prof. JOHN B. SMITH, Entomologist New Jersey Experiment Station, says: "I can say briefly that the Disparene has proved thoroughly satisfactory and safe wherever used. My experience with it has been so satisfactory this year that I have recommended it widely."

## **Endorsed by Experiment Stations.**

Prof. H. J. WHEELER, Director Rhode Island Agricultural Experiment Station, writes: "I watched the experiments with your Disparene quite closely during the summer, and am aware that it was very efficacious."

Director C. E. THORNE, Ohio Experiment Station, in Press Bulletin No. 224, May 27, 1901, says: "Inasmuch as Bordeaux Mixture . . . is needed for apple scab and other fungous diseases, the most economical plan is to spray with this mixture, adding sufficient poison to kill the worms. . . . Three or four pounds per barrel of Disparene may be better (than Paris green) for the reason given below. . . . If it is desired to use poison alone, either arsenate of lead or Disparene is preferable, because neither injures the foliage."

## **Dollars from Disparene.**

The well-known horticulturist, Dr. W. I. CHAMBERLAIN, in the *Ohio Farmer* of November 7, 1901, gives figures showing his net profits from five acres of bearing apple trees for that year to be \$1,600.35. He says: "The reason why the apples were so perfect this off year, when imperfect and wormy apples were elsewhere so very common, was because of the thorough spraying given them, and especially the late spraying with Bordeaux Mixture and Disparene. The latter (unlike Paris green) held to the fruit long enough to kill the second brood of the codling-moth worms."

In the *Farmer* of December 12, 1901, Dr. CHAMBERLAIN says: "The Disparene sticks on like paint, and kills the second brood of the codling-moth worm; but for spraying I should probably not get \$200 from my apple trees this year. I know this from a few trees we left without spraying. They had almost no perfect apples. The sprayed ones had almost no imperfect ones."

## **From a Prominent Agricultural Dealer.**

Messrs. H. C. PUFFER COMPANY, Springfield, Mass., write: "We are very much pleased with the results obtained from spraying with your Disparene. It does all that you claim for it."

## **Good Results in the Orchard.**

Hon. JAMES C. POOR, Essex County, Mass., says: "The Disparene bought of you was used on some apple trees that were badly affected with canker worms. One spraying, which was very quickly and easily done, stopped them, and we have some very large, sound apples on the trees that were sprayed. I like the Disparene very well. It is easy to apply and prompt in effect."

Mr. JOSEPH C. STEELE, Preble County, Ohio, writes: "We used your Disparene on plum, Russian apricots, and apple trees, for the canker worm. After applying it, the worms disappeared in short order."

## **Disparene holds Fast.**

The *Ohio Farmer* of June 14, 1900, referring editorially to Bowker's Disparene, say: "We shall use Disparene in preference to Paris green hereafter in our orchards for codling-moth and tent caterpillar and on our potatoes for the bugs, using it in Bordeaux Mixture. We expect to save far more on the labor than the extra cost of material. Paris green washes off in the first heavy rain. Disparene holds fast."

## **Value on Strawberries.**

Few strawberry growers are better known than the Hon. R. M. KELLOGG, President Michigan State Horticultural Society. He says: "The Disparene you sent me was an entire success. It disposed of all leaf-eating insects, and did not injure the strawberry foliage in the least. I regard it as very much superior to Paris green."

## **Killed Brown-tail Moth.**

Mr. GEORGE W. MCKEE, Forester, Medford, Mass., writes: "I used your Disparene extensively against the brown-tail moth, and with excellent results. It killed the insects quickly, and stuck to the leaves through several very hard rains. I used an extremely fine nozzle, but the Disparene never clogged it. It was easy to mix and apply, and kept up in the water with little stirring."

## **Effective on Roses.**

*American Gardening* of May 18, 1901, in referring to insects which attack roses, says: "All leaf-eating insects are effectively destroyed by Disparene. When we first began to use it, we were a little afraid of the results on the foliage, but after repeated trials find that it is quite safe."

Mrs. KATE L. SMITH, Roxbury, Mass., writes: "I used your Disparene for slugs and worms on rose bushes with excellent results."

## **A Remedy for Grape-root Worm.**

Mr. S. W. SMART, Lake County, Ohio, says: "I have used your Disparene for two years on my vineyard, for the grape-root worm. I think another season, with as many sprayings as the vines had this year, will nearly free them from the beetle. We applied Paris green twice to our potatoes, yet the bugs thrived on it. One dose of Disparene finished them. I think it more effective and cheaper than Paris green."

## **From a Well-known Editor.**

Mr. BENEDECT PRIETH, the well-known editor of the *New Jersey Freie Zeitung*, says: "The Disparene was very satisfactory in protecting my trees and shrubs from the ravages of the caterpillar and other insects. It made my garden look like an oasis in a desert."

## **What Cranberry Growers say.**

A. D. MAKEPEACE, West Barnstable, Mass., the largest cranberry grower in New England, writes: "I have a good opinion of insecticides of the arsenate of lead class, for cranberry leaf eating insects. We have used a considerable quantity of these goods the past season, some being of your manufacture and some of our own mixture, both with good results."

Mr. WILLIAM DIXON, a successful Massachusetts cranberry grower, says: "Last spring I made three divisions of my cranberry bog, on the first of which I used Paris green; on the second I used an insecticide manufactured at Dennisport; and on the remaining third I used Bowker's Disparene. The beneficial effects of the Disparene could be seen almost from the start, and from that part of the field I obtained a most satisfactory crop of cranberries. The remainder of the field, on which Disparene was not used, turned out to be practically a total loss."

## **Killed Span-worms.**

The well-known growers, JONES & HEALD, Barnstable County, Mass., write: "We think very favorably of the Disparene we bought of your house. It was used on our cranberry swamps, we think, with great effect. We used it particularly for the span-worm, after our bogs were in bloom, without injury to the blossoms."

## **Disparene saves Crops.**

Mr. S. A. BESSE, New York, the owner of a large bog, writes: "During May and June of 1900 our cranberry bogs were twice sprayed with Disparene. For two years before we suffered greatly from the ravages of fire-worms. We had very few beds injured by worms, and harvested the largest crop we ever had."

## **Better than Tobacco Water.**

The secretary of the Starr Bog Company, Mr. ALTON H. BARR, Worcester County, Mass., says: "We had good results in using Disparene for fire-worms and span-worms. It adhered to the foliage, and was much superior to tobacco water, which we had used seasons before."

## From William F. Gale, Springfield's City Forester.

The work which City Forester W. F. GALE has done against the elm-leaf beetle at Springfield is a model of its kind. It has been a striking object lesson to foresters and park superintendents throughout New England. Mr. Gale writes: —

“We used last year a little less than two tons of your Disparene on our street trees as a protection against the elm-leaf beetle. The results were very satisfactory: less than four per cent. of our elms were defoliated, which is conclusive evidence that this insecticide is effective. There is but one way to protect trees from leaf-eating insects, and that is by spraying. I know of no better preparation to use than Bowker's Disparene.”

Mr. W. A. WIGHT, Middlesex County, Mass., writes: “I sold a large quantity of your Disparene last summer for use against the brown-tail moth. It was found to be satisfactory in every respect.”

## From a Prominent Horticulturist.

Prof. W. J. GREEN, Experiment Station, Wooster, Ohio, in the *Ohio Farmer* of May 30, 1901, says: “Disparene will do in place of Paris green for both the plum curculio and canker worm,—in fact, it is cheaper in every way. The thing to do in this case is to make fighting canker worms the principal business, and Disparene is the best thing to use.”

## Valuable for Parks.

Mr. H. L. FROST, of Boston, Professional Forester, says: “During the seasons of 1900-1901 I used a very large quantity of your Disparene, and find it entirely satisfactory in every way. I find that it adheres well to the foliage, and have failed to find any case of burning, though we have used a very strong solution in extreme infestations of the canker worm and elm-leaf beetle. It is more expensive than other arsenical poisons as per first cost, but much less expensive as per results. We believe it to be the only poison for leaf-eating insects, and shall recommend it as such to all who ask our opinion.”

## A Sure Remedy for Elm-leaf Beetle.

Mr. THEODORE WIRTH, Superintendent of Parks, Hartford, Conn., writes: “We have used your Disparene for the last two years against the elm beetle, and have been successful with the same. It is easily prepared, adheres to the foliage after once drying on, and does deadly work among the insects.”

Mr. H. O. TAYLOR, New York, says: “I used your Disparene as directed on my elms at Cobalt, Conn., last spring, and found it very effective. I think it killed 90 per cent. of the beetles and larvae. It remained on the leaves indefinitely.”

## Killed the Beetles quickly.

Mr. S. H. STURGIS, Tree Warden, Hull, Mass., says: “In reply to your card I would say that for the uses to which I put your Disparene the effect was prompt. The practical value of the insecticide is great. When I want anything for the same purpose again, I will know where to send.”

Tree Warden THOMAS BYWATER, of Groton, Mass., writes: “As tree warden I sprayed extensively with Bowker's Disparene, to prevent damage by the elm-leaf beetle. This insect has been very injurious in this town for the past two or three years. This Disparene worked to perfection and gave complete satisfaction. The sprayed trees were kept in good foliage, while the unsprayed were severely injured. I shall advise the use of Disparene next year.”

## From a Well-Known Firm of Nurserymen.

The name of THOMAS MEEHAN & SON is doubtless known wherever fruit or shade trees are grown in this country. They write: —

“We have given Bowker's Disparene a thorough test for the bag worm, and found it very effective.”

*Keeps Caterpillars Down.*

## **BOWKER'S BODLIME.**

### **For Canker Worms.**

Bowker's Bodlime prevents canker worms, cut worms, caterpillars, ants, and all creeping things from crawling up trees. It is a sticky composition of pleasant odor and color, and is applied to the bark in a narrow band about two inches wide, one-half an inch thick at the bottom, and tapered in to the bark at the top.

Metal tree protectors are of small practical value: they need constant care, are soon outgrown, or rust out. The labor required to keep them in repair will pay for several applications of Bodlime.

Bodlime needs no watching, and is always serviceable. Ink or tar bands soon dry up, and need frequent renewal. Bodlime does not dry up, needs no renewal, *one banding being sufficient for an entire season.*

Wool or cotton bands become matted by rain, and insects pass over them. Bodlime is not affected by the weather, and no insects can cross it. Bodlime is also useful in keeping the caterpillars of the brown-tail and tussock moths from ascending trees.

Properly applied, Bodlime saves the labor of spraying, and preserves and protects the tree. Its use will insure foliage on your shade trees and fruit in your orchard. One-fourth to one pound is sufficient per tree, according to size. Full directions with each package.

**CAUTION.** Always remove the bands after all danger from insects has passed.

5 pound can,	\$0 75	50 pound keg,	\$4.00
10 " "	1.25	100 " "	7.50
25 " "	2.25		

### **What our Customers say.**

WILLIAM H. SPOONER, Esq., ex-President of the Massachusetts Horticultural Society, writes as follows: "Last autumn I used Bowker's Bodlime on my elm, cherry, and apple trees as a preventive against the canker worm, and with excellent success. My trees have never been as free from depredations of this insect as now. I consider the experiment a success, and shall use Bodlime again. As the material is applied to the tree without paper, it is much more convenient to use than printer's ink."

### **From a Practical Farmer.**

MR. GEORGE F. HILDRETH, a progressive Middlesex County (Mass.) farmer, writes: "Last spring I used Bowker's Bodlime on my orchard trees, to prevent damage by canker worms. The results were very satisfactory. My trees kept in good foliage throughout the season, while untreated trees in the vicinity were badly injured. I prefer to use Bodlime rather than printer's ink, because with the latter substance I have to ink the trees five or six times, while with the Bodlime one good application does the business."

### **Bodlime protected Street Trees.**

Commissioner P. R. BUGBEE, of Hanover, N.H., writes: "Answering your recent letter concerning the use of Bodlime for preventing damage to trees by the canker worm, I beg to say that we used over a thousand pounds on the shade trees of the village this spring. We found it very effective, and its thorough use is all that saved our trees from the ravages of the pest."

## **From the New Hampshire State Entomologist.**

Prof. C. M. WEED, State Entomologist, New Hampshire State Experiment Station, in Bulletin No. 85, on the canker worm, writes: —

“ Various substances have been used in the past for this banding of the trees, printers’ ink being perhaps the most popular of these. The best thing now available, however, is the substance called Bodlime, made by the Bowker Insecticide Company, of Boston, Mass. This is a thick, pasty material, which may be put directly upon the bark of the trees in a wide band. It will remain fresh and in position for months.”

### **Complete Remedy for Canker Worm.**

S. H. FOLSOM, Esq., Registrar of Probate, Cambridge, Mass., writes: “ I made one application of your Bodlime to my apple trees last spring, which nearly freed my trees of the canker worms which for years have infested them. I regard your Bodlime, applied early in the spring, a complete remedy for the canker worm.”

### **Protects from Caterpillars.**

Mr. H. M. NELSON, of the Citizens’ Savings Bank and Trust Company, St. Johnsbury, Vt., writes: “ I used Bodlime, manufactured by the Bowker Chemical Company, on my shade trees this spring and early summer, and found the article first-class in preventing the forest tent caterpillar and other crawling pests from climbing the trees, remaining the entire time it was on the trees nearly as soft and sticky as when first applied.”

### **The Bands Kept Sticky.**

The proprietor of the Elmside (Mass.) Farm, E. C. BARBER, writes: “ In regard to the Bodlime which I used on my trees last spring, I will say that it will hold the moths of the canker worm, and I liked it particularly for the reason that it did not harden as quickly as the tree ink.”

### **Stopped Climbing Cut Worms.**

Many Western fruit growers have been troubled by cut worms, which climb the trees and destroy buds and foliage. Mr. C. C. CHESBRO, Van Buren County, Mich., used Bowker’s Bodlime in combating these insects. He writes: “ The cut worms did not crawl over the Bodlime bands. Soon after putting on the Bodlime I went out with a lantern one night and watched the cut worms vainly try to crawl over the bands. I did not apply the Bodlime nearly as thick as you advised, and it answered the purpose just as well.”

### **Bodlime prevents Damage.**

Mr. FRANK L. GAGE, a Massachusetts cemetery superintendent, writes: “ Where Bowker’s Bodlime was used, the female canker-worm moths were unable to ascend the trees, and the number of pests was greatly reduced. Unfortunately, some of the trees under my care were badly infested before I applied the Bodlime, and in these cases spraying was necessary. I have no hesitancy in saying that, if the trees are free from canker worms to start with, Bodlime will keep them entirely free. I shall use Bodlime as a preventive, as I believe in that capacity it cannot be excelled.”

### **Prevents Injury by Ants.**

From Washington, D.C., W. CURTISS, Esq., writes: “ Replying to yours of August 6, I would say that Bodlime was effective in preventing damage by the canker worm and black ants. I am much pleased with all the preparations received from your house.”

### **Very Effective.**

Prof. C. R. LANMAN, of Harvard University, writes: “ The elms on my place seem to have done remarkably well this year, and the Bodlime seems to me to be an effectual and convenient means of protection to the trees from the ravages of noxious insects. I have just had it applied anew according to directions, and intend to persist in its use.”

*For San José Scale, etc.*

## **BOWKER'S TREE SOAP.**

### **For Scale Insects.**

This soap is made from high-grade materials, particularly to meet the demand for an effective treatment for the San José scale and other armored scales. The ordinary whale oil soaps sometimes used for this purpose contain soda, are hard, and do not dissolve readily. They thicken in cold water, and are unsuited for use as winter washes.

Bowker's Tree Soap contains no soda, mixes easily with cold water, and may be sprayed at any temperature above freezing. It is especially valuable for the treatment of the San José scale and allied insects, since the caustic potash which it contains is very effective in dissolving the waxy coverings of these insects.

This insecticide may be used on greenhouse and other plants, to destroy plant lice, and in all cases may be safely substituted for whale oil soap. Full directions with each package.

5 pound can,	\$0.50	50 pound keg,	\$4.00
10 " "	1.00	100 " "	7.50
25 " "	2.25		

### **The Best Kind of an Endorsement.**

Massachusetts's well-known entomologist, Prof. C. H. FERNALD, writes: "I sprayed pear trees, badly infested with the pear psylla, with Bowker's Tree Soap, and obtained excellent results. Had I received the sample in time, the success would have been even greater, as the insects were able to fly at the time the spraying was done."

Mr. E. K. BETTS, Troy, N.Y., says: "What I don't know about bugs and things would fill a large book. But the Yankee, the Dane, and the Englishman, who are the real proprietors of my small farm, all say Bowker's Tree Soap is the best they ever saw, and I guess they know; so I am satisfied it is a good thing and all right."

### **One of the Oldest Nurserymen in New England says: —**

"We have used Bowker's Tree Soap, manufactured by the Bowker Chemical Company, against aphids and the elm-bark louse, and have found it satisfactory, and have taken occasion to recommend it to many of our customers. We consider it a good thing for either amateurs or professionals to use."

### **A Remedy for San Jose Scale.**

Mr. G. A. PARKER, Superintendent Keney Park, Hartford, Conn., says: "I found your Tree Soap very effective in combating the San José scale, and shall use it quite extensively this winter. It is absolutely non-injurious to dormant plants, conifers included."

Mr. JOSEPH E. PERKINS, Greenwood, Mass., writes: "I used your Tree Soap on fruit trees infested with the San José scale, and am satisfied that if it is applied as a winter wash it will quickly exterminate the pest."

### **Kills Scale Insects.**

Mrs. E. L. GRAHAM, Norfolk County, Mass., says: "I used your Tree Soap against scale insects with complete success, and have recommended it to several of my neighbors."

# HOW SPRAYING PAYS.



Sprayed Gravensteins.



Gravensteins not Sprayed.

*For Plant Lice, etc.*

## **BOWKER'S INSECT EMULSION.**

This insecticide has made a decided "hit." It has been extensively used by prominent gardeners and fruit growers with the best results. It is a carefully made emulsion, containing several oils of great value as insecticides, and is put up in handy form for ready use. It does away with the trouble of making emulsions, and affords an insecticide of double the strength of kerosene emulsion.

For use it is diluted one part to twenty parts of water, hence it is probably the most economical known remedy for plant lice, green fly, black fly, aphids, mealy bugs, scales, and allied insects. While it is invaluable for use in greenhouses, it is just as effective when used to destroy plant lice on cherry, peach, or other trees.

It is a cheap and complete substitute for kerosene emulsion, whale oil soap, and similar preparations, and is probably the handiest and most generally useful emulsion now on the market.

Will keep in all climates. Full directions for use with each package.

1 quart can,	\$0.50	2 gallon can,	\$1.75
2 " "	.75	5 " keg,	3.00
1 gallon "	1.00		

### **From the Secretary Massachusetts Board of Agriculture.**

The Hon. J. W. STOCKWELL, Boston, Mass., writes: "I have used with great satisfaction the Insect Emulsion prepared by the Bowker Chemical Company. It not only does all that is claimed for it as an insect destroyer, but it is ready when wanted for immediate use. This last is important, as the work of preparing the mixture so often leads to neglect. I intend keeping it constantly on hand, and seldom go to my farm but I find occasion to use it, to save crops from insect ravages."

### **Killed the Pea Louse.**

Hon. EDWARD BURNETT, Agricultural Engineer and Expert, New York, writes: "I used your Insect Emulsion on the pea vines at C. H. Mackay's, Roslyn, L.I., N.Y., and the results were more than satisfactory. I have also advised several friends to write you in regard to their troubles with insects."

### **From an Eminent Entomologist.**

Prof. G. H. PERKINS, Entomologist University of Vermont Agricultural Experiment Station, Burlington, Vt., writes: "I tried Bowker's Insect Emulsion, prepared by the Bowker Chemical Company, this year, and am very much pleased with the results. It is excellent and most convenient to use."

### **From a Successful Grower of Rare Flowers and Fruits.**

Mr. KENNETH FINLAYSON, of Brookline, Mass., writes: "I have used Bowker's Insect Emulsion prepared by the Bowker Chemical Company, on apple trees, for the black fly, with good results. I have not the slightest doubt but that it is an excellent wash for orchard trees of all kinds in early spring, at which time it can be applied considerably stronger than I have used it."

## **Valuable on Roses.**

Mr. E. B. ROBERTS, Dorchester, Mass., says: "I used your Insect Emulsion on my rose bushes, to destroy the green fly, with the best of success. In two applications the lice entirely disappeared, and there was no injury to the bushes."

Mr. THOMAS K. HENDERSON, Huntingdon County, Pa., says: "I used your Insect Emulsion on cabbage, to destroy the worms, and it did the work all right."

## **Remedy for Scale Insects.**

Mr. EDWARD M. EAMES, Middlesex County, Mass., writes: "The Insect Emulsion you furnished me for use on the Kilmarnock willow, badly infested with the oyster-shell louse, was very effective. It stopped the work of the insects at once, and we shall be able to save the tree to which it was applied."

The Hon. B. P. WARE, Essex County, Mass., writes: "My rose bushes were badly infested with the aphis, or green fly. I used your Insect Emulsion, and found it easy to apply and effective in results, without injury to the foliage."

## **Killed Hen Lice.**

Mr. ALBERT RUSSELL, Schoharie County, N.Y., writes: "Last year I could not lay my hands on anything around my poultry house without getting them covered with hen lice. I sprayed the house once thoroughly with your Insect Emulsion, and there have been no lice there since."

## **Too much for Elm-leaf Beetle.**

Mr. JAMES A. MORSE, Tree Warden, Foxboro, Mass., says: "I used your Insect Emulsion in destroying elm-leaf beetle larvæ and pupæ around the base of the infested trees. It killed every one it came in contact with."

## **Satisfactory, Convenient.**

Mr. N. B. EAMES, Middlesex County, Mass., writes: "The past season I have used Bowker's Insect Emulsion to destroy plant lice on plum trees and currant bushes. In each case it has given satisfactory results, destroying the insects in a short time. It mixes easily with water, and comes in a very convenient form for use."

## **From a Well-Known Concern.**

Messrs. H. T. HARMON & Co., seedsmen and dealers in agricultural implements, Portland, Me., write: —

"We have used considerable of Bowker's Insect Emulsion for spraying peas which had been attacked by the pea louse, and have to report that it kills every louse it touches; and, when applied early as it should be, it gives good results."

Prof. GEORGE T. POWELL, Director School of Agriculture and Horticulture, Briarcliff Manor, N.Y., writes: "The Insect Emulsion we found very effective, especially on the rose aphis."

## **Easy to Apply.**

A well-known farmer of Grafton County, N.H., Mr. OSCAR STAPLES, writes: "Your Insect Emulsion will do all for which it is recommended. It is easy to apply and effective."

# **EFFECTIVE REMEDIES.**

## **BOWKER'S A. C. C. MIXTURE.** For blights and mildews.

This is an ammoniacal solution of copper carbonate, and is used to check the growth of fungous diseases on fruit or vegetables soon to be marketed, and which, therefore, cannot be sprayed with an adhesive remedy like Pyrox or Bodo Mixture. The A. C. C. Mixture is especially valuable for preventing rusts and blights on carnations, hollyhocks, and other ornamental plants. It is ready for use when diluted at the rate of one pint to twenty gallons of water, and is applied as a spray. Full directions with each package.

1 quart, \$0.50  
2 " " 1.00

In kegs and barrels  
At \$2.00 per gallon

## **BOWKER'S CARBOLIZED WASH.** For Borers.

The fruit-bearing capacity of many orchards is greatly impaired by damage resulting from various kinds of borers. These insects, having once entered the bark, cannot be destroyed by poison. The female insects, however, may be effectively prevented from depositing their eggs by coating the trunks and larger branches with Bowker's Carbolized Wash.

Dilute this insecticide at the rate of one gallon to eight of water, and apply with a good whitewash or scrubbing brush. Full directions with each package.

1 gallon can, \$1.00  
2 " " 1.75

5 gallon keg, \$3.75

## **BOWKER'S FORMALIN.** For Potato Scab.

Since the potato scab is now known to be a fungous growth, it is important that seed potatoes should be freed from the disease when planted. To prevent scab, soak all seed potatoes in a solution of one-half pint Bowker's Formalin in fifteen gallons of water for one hour, then dry, cut, and plant. Complete directions with each package.

CAUTION.—Formalin is easily adulterated by the addition of water, and much of this diluted article is offered in the market. Bowker's Formalin is guaranteed to be pure and of full strength.

1/2 pint can, \$0.50  
1 " " 1.00

1 quart can, \$1.50

## **FORMALIN PREVENTS POTATO SCAB.**

Mr. JOHN E. ELLIS, Gilead, Conn., writes: "I used your Formalin for potato scab, both in 1900 and 1901, and as a result have had smooth potatoes each year."

Mr. W. G. FARNSWORTH, Lucas County, Ohio, says: "My experience with your Formalin was entirely satisfactory."

Mr. B. C. KNIGHT, Middlesex County, Mass., writes: "I used your Formalin on my seed potatoes with very satisfactory results. My potato crop this year has been the best I ever raised."

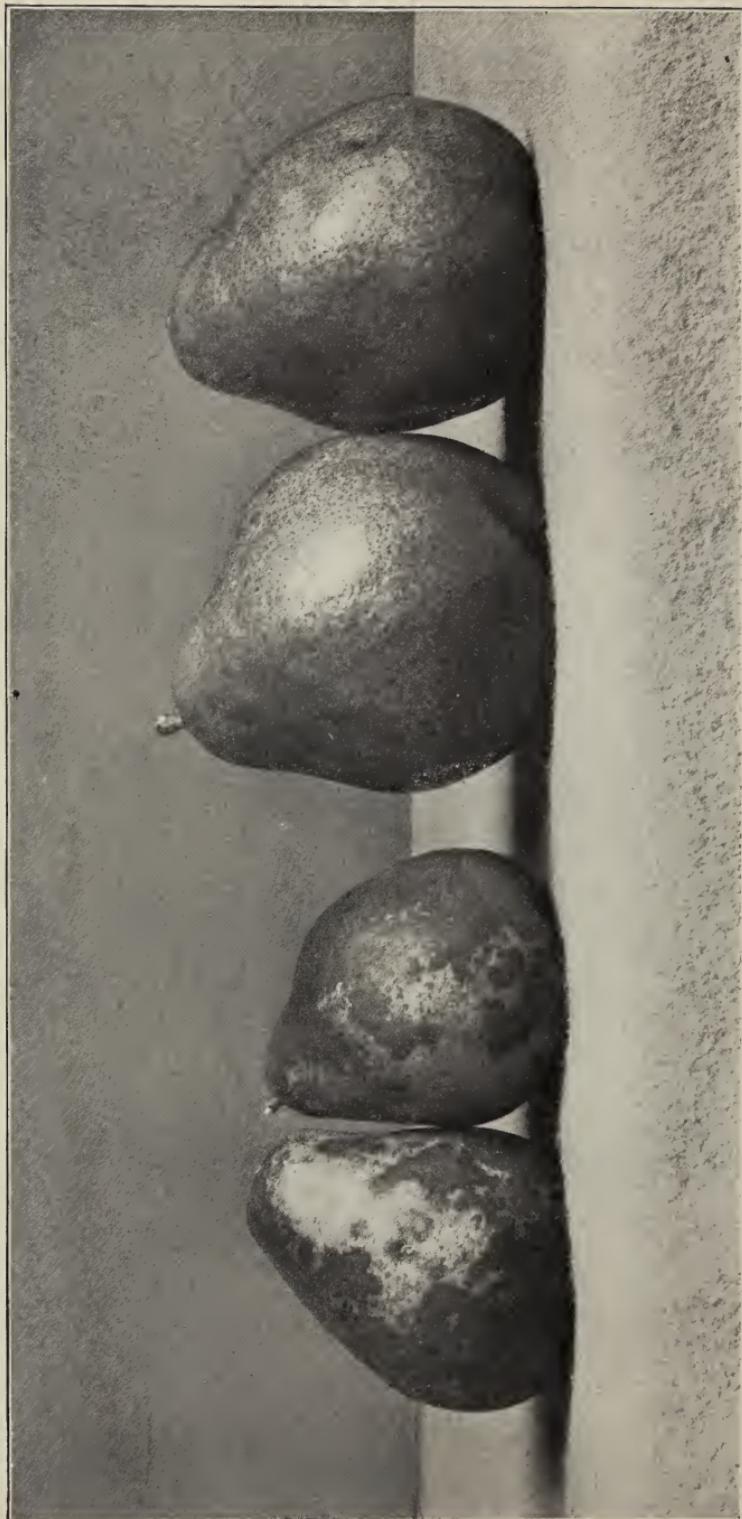
## **BOWKER'S CYANIDE OF POTASH.** For Fumigation.

We offer a 98 per cent. pure cyanide of potash for use in fumigating nursery stock, houses, grain warehouses, etc. We will be glad to advise our customers free of charge concerning the details of such operations.

1 pound package, \$0.50  
5 " " 2.25

10 pound package, \$4.00

Mr. J. M. BELDEN, New Britain, Conn., says: "I had splendid success in fumigating my grain warehouse with your cyanide of potash. Since applying the treatment as you directed, I have had no further trouble from grain insects."



**Pears Sprayed with Bowker's "Pyrox."**

Sound, smooth, and fair.

**Pears Unsprayed.**

Note the attack of the rust or scab.

## **ARSENATE OF LEAD INGREDIENTS.**

Some park superintendents and large orchardists prefer to make their own arsenate of lead as needed for use. Upon request we are prepared to submit quotations on the required ingredients. We carry on hand a complete stock of acetate of lead, high-grade nitrate of lead, and arsenate of soda. Our arsenate of soda is of about ninety-six per cent. purity, free from chlorine, and *cannot be duplicated* in the American market. We will be glad to advise customers concerning the necessary amounts of the respective ingredients.

Mr. W. C. SMEAD, Genesee County, N.Y., says: "I found your arsenate of lead superior to anything I have ever used, because it assimilates so well with water. It is effective in results, and adheres so well to the foliage that I found traces of it this fall, when picking the fruit."

Writing of the grape-root worm in Bulletin 184 of the Cornell University Experiment Station, Prof. M. V. SLINGERLAND says: —

"As the beetles feed openly upon the upper surface of the leaves, one can easily feed them poison with a spray pump. . . . In 1896 Mr. Webster\* reported that 'the beetles do not yield at all readily to poisons.' In 1900 he reports that 'at present there are some grounds for hoping that arsenate of lead (Bowker's Disparene) may prove effective in killing off the beetles before they have oviposited.' . . . The arsenate of lead, although more expensive, is to be recommended in preference to other poison, as it will stick on the foliage much longer, and there is not the danger of burning the leaves with a strong mixture that there would be from using Paris green and similar poisons."

\* Prof. F. M. WEBSTER, Entomologist Ohio Experiment Station.

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## **Miscellaneous Chemicals always in Stock.**

**ASK FOR QUOTATIONS.**

Acetate of Lead.	Hellebore.
Arsenate of Soda.	Kainit.
Arsenic.	Nitrate of Lead.
Blue Vitriol.	Potassium Sulphide.
Carbon Bisulphide.	Raupenleim.
Copper Sulphate.	Sulphur.
Corrosive Sublimate.	Sulphuric Acid.
Creosote Oil.	Tobacco Powder.

# New Goods

ON THIS AND THE FOLLOWING PAGE we offer a few new specialties that will be found of great value to farmers, fruit growers, gardeners, and others. These goods have been thoroughly tested in our experimental laboratories and fields, as well as by farmers of large practical experience.

## BOWKER'S "BOSTON WHITE."

A powerful insecticide, designed to take the place of Paris green in the treatment of leaf or fruit eating insects. It may be used singly or combined with fungicides. It is prompt in its effects on insects, and if applied as directed will not injure the foliage. It is white in color, and shows plainly wherever applied. Being in the form of a fine white powder, it may be used dry with a duster or wet with a sprayer or sprinkling apparatus. Applied to potatoes dry at the rate of two pounds to the acre, it will clear the vines of both slugs and beetles in twenty-four hours. Its effects are equally prompt on fruit or shade trees, where it should be used at the rate of one pound to seventy-five gallons of water.

1 pound, \$0.25.

6 pounds, \$1.25.

## BOWKER'S "COPPERAL."

### A Dry Bordeaux Mixture.

Many experiments have been made to produce a dry Bordeaux Mixture that would possess all the qualities of the freshly made article and keep without deterioration. Up to this time nothing has been produced which fills the bill completely. "Copperal" answers every requirement. It is scientifically compounded, and put up in handy form for use. When needed, all that is required is to add water and spray.

"Copperal" possesses all the properties of wet Bordeaux Mixture, can be prepared in large or small quantities, is always ready for use, and will keep indefinitely in any climate. It is a valuable remedy for nearly all fungous diseases of fruits or vegetables, and can be safely and effectively used wherever a fungicide is needed, to prevent blight, scab, mildew, or rust on fruit or vegetables. It also contains some fertilizing qualities, promoting the growth of the plants and trees to which it is applied.

One pound makes six gallons of full strength or twelve gallons dilute fungicide.

1 pound, \$0.25.

6 pounds, \$1.25.

## **BOWKER'S "ANTISEPTIC** **AND DISINFECTANT."**

A most powerful antiseptic, disinfectant, and germicide. It kills germs, microbes, and insects, deodorizes, disinfects, and prevents decomposition and disease. It is a powerful cleansing and purifying agent. Invaluable in the household, in the stable, and on the farm. It is useful in cleansing woodwork, floors, sinks, cellars, water-closets, etc. Highly useful for disinfecting poultry houses, sheds, etc.

It has few equals in treating cuts, burns, bruises, or sores on man or animal.

As an insecticide it is effective in destroying fleas or lice on dogs, cats, sheep, etc.

Bowker's Antiseptic is a dark, thick liquid, which is diluted at the rate of one part to fifty or one hundred parts of water, according to the purpose for which it is used. One gallon is sufficient for a year's supply for the average family, and no family should be without it.

One pint, \$0.50  
One quart, 1.00

One gallon, \$2.00  
Five gallons, 8.00

## **BOWKER'S "WEEDICIDE."**

Bowker's "Weedicide" kills weeds, grass, poison ivy, poison sumac, and all kinds of undesirable vegetation. It keeps walks, drives, and tennis courts absolutely free from vegetable growth of any kind, thus doing away with the labor and expense of repeated hoeing and rolling.

Bowker's "Weedicide" is a fine, granular material, which, for use, is dissolved in water at the rate of one pound to ten gallons, and applied with a sprinkler or watering-pot. The effects of the "Weedicide" are apparent within forty-eight hours of the application, and two treatments are all that are necessary for an entire summer. It does not injure stone or metal work of any kind. The largest poison ivy vines or sumac bushes are easily killed by applying a small amount of Bowker's "Weedicide." Full directions with each package.

1 pound, \$0.40  
3 " 1.00

5 pounds, \$1.50  
10 " 2.75

# **IMPORTANT INFORMATION.**

## **How to Spray.**

First. Spraying mixtures should always be applied as a fine mist and never in a stream. *The spray should fall like dew on the foliage.* You cannot get good results from spraying, even with the best insecticides, if you do not apply them in the right manner.

Second. Use a fine nozzle, and hold it far enough from the leaves to allow the mist to diffuse in the air. Spraying should always cease as soon as the foliage begins to drip.

## **Quantities Required.**

**For Potatoes.** Where a knapsack or spray pump of ordinary pattern is used, fifty gallons of solution will be required for one spraying per acre. With horse power sprayers, twenty-five gallons will be sufficient per acre, but with these machines the charge of insecticide or fungicide should be doubled.

**For Apple Trees.** Trees five years old, in foliage, will require one gallon per tree per spraying; trees ten to fifteen years old, allow from one to two gallons each; old, full-grown trees, five to ten gallons each.

**For Shade Trees.** The amount of spraying solution required for shade trees varies with their size. Elms forty feet high will require ten gallons each, while those sixty feet high will require thirty or more gallons each.

**Packages.** The five, ten, and twenty-five pound sizes of Bowker's Germo-insecticides are packed in chemically treated tin cans. The fifty and one hundred pound sizes are packed in treated wooden kegs.

While these goods will keep in all climates, they should not be allowed to freeze or be exposed to a temperature above 100° F.

When a package is opened and a part of its contents used, the remainder should be slightly covered with water to prevent evaporation and caking, *and the cover replaced.*

**The "Off Year."** Many farmers do not spray their trees in the off year. This is a grave mistake. It is just as important to keep the tree healthy at this time as when loaded with fruit. Trees well sprayed in the off year will come to the bearing year in a high state of health, reasonably free from scab, rot, and insect pests.

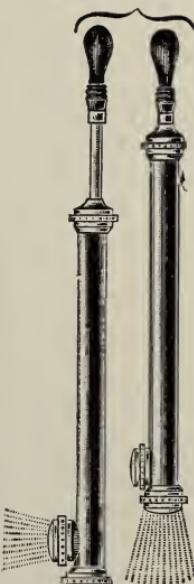
**Questions Answered.** We have in our employ a trained entomologist and botanist, who will be glad to advise, free of charge, concerning the treatment of insect pests or fungous diseases. All inquiries should be accompanied by suitable specimens, with a full statement of the nature of the trouble.

# SPRAYING OUTFITS.

A spraying outfit suited to the work in hand is almost as much of a necessity as reliable insecticides or fungicides. Our experts have had many years of experience in actual spraying operations, and are thoroughly familiar with the requirements of this work. In past years many of our customers have asked us to select spraying apparatus for them, in order that they may be sure of getting outfits adapted to their needs. To accommodate this branch of our trade, we have decided to list a few complete outfits which we have tested personally and found satisfactory. These outfits are fully guaranteed, and will be sold for net cash only.

## BRASS SYRINGES.

These syringes are well suited for the spraying operations necessary in a kitchen garden, florist's establishment, or greenhouse. By their use fruit trees up to twenty-five feet in height can be thoroughly sprayed.



No. 1. Brass Syringe. Length, 14 inches; diameter, 1 inch; 2 spray roses and jet. Price, complete . . . . . \$4.00

No. 2. Brass Syringe. Larger and more powerful than No. 1; length, 16 inches; diameter, 1 7-16 inches; open rose spray, side spray, and cap. Price, complete . . . . . 4.50

Shipped from Boston.



## KNAPSACK SPRAYERS.

This sprayer is composed of a five-gallon Deming copper knapsack with substantial brass pump, agitator, hose, short spray pole, and nozzle. Suited for use in truck gardens, orchards, or on field crops in general. By using an eight-foot pole extension, full-grown apple trees can be sprayed. Properly cared for, this outfit will last fifteen years.

Price, complete, \$15.00. Shipped from Boston.

## BARREL PUMP.

This is the well-known Empire King pump, mounted in a sound, tight, second-hand oil barrel. The pump has brass working parts, large air chamber, and a powerful agitator. The complete outfit includes pump, barrel, fifty feet white cotton hose, one spray pole, and one Vermorel nozzle. This outfit has few equals for orchard work.

Price, complete, \$23.00. Pump only, no attachments, \$13.00.  
Shipped from Lockport, N.Y.



## PARK OUTFIT No. 1.

This outfit is suitable for the largest spraying operations. It has been used successfully on the tallest elms as well as on large orchards. The pump and air chamber are extra powerful, and the whole is substantially made, and easily operated. Our complete outfit includes Friend pump, suction hose, strainer, one hundred feet one-half inch cotton hose, one spray pole, and one Vermorel nozzle. Hogshead or barrel must be supplied by purchaser. Price, complete, \$50.00. Shipped from Gasport, N.Y.

## PARK OUTFIT No. 2.

The same as No. 1, but includes two hundred feet of hose, two spray poles, two Vermorel nozzles, and Y hose connection. The pump will operate from one to four lines of hose. Price, complete, \$65.00. Shipped from Gasport, N.Y.

## P R O M P T D E L I V E R I E S.

By our extensive business connections we are able to obtain prompt shipments of outfits of all kinds. Whenever we have outfits or accessories in stock at Boston, shipment will be made from that point. In all cases transportation charges must be borne by purchasers.

**Bowker  
Insecticide Co.,  
43 Chatham St.,  
Boston.**



# HANDBOOK OF Insects and Diseases Affecting Fruits, Garden Crops and Shade Trees.

## THE APPLE.

### Codling Moth: Apple Worm (*Carpocapsa pomonella*).

No doubt the codling moth is much more destructive to the apple than any other single species of insect. It is now widely distributed, and has become abundant wherever apples are grown. The moth is small, grayish, with brown markings on its wings. The eggs are deposited singly anywhere on the newly formed fruit, and are often found on the foliage. The newly hatched larvæ usually enter the calyx cup while the fruit is still upright. They soon eat their way to the core, and the pinkish-colored worm causes a premature dropping of the fruit. The pear crop is also injured by the codling moth.

REMEDY.—Spray with Bowker's Pyrox as soon as the blossoms have fallen.

### Bud Moth (*Tmetocera ocellana*).

The small caterpillars of this moth feed upon the buds of the apple early in the spring. They destroy both fruit and leaf buds, and cause the trees to make a dense, scraggy growth.

REMEDY.—Spray with Bowker's Pyrox when the buds commence to swell.

### Canker Worms (*Paleacrita vernata*: *Anisopteryx pometaria*).



These are the "inch worms" often so injurious in May and June to apple and other trees. When abundant, the insects riddle the foliage, leaving the trees as brown as if scorched by fire, the young fruit falls and the growth of the tree is checked. The full-grown insects enter the ground and transform to pupæ, from which the moths emerge in the fall or spring, according to the species. In this region the fall canker worm is more abundant than the spring species. The female moths are wingless and climb up the tree trunks in search of suitable places in which to lay their eggs.

PREVENTIVE.—Band the trees with Bowker's Bodlime in October or November. Freshen the bands in March. This will prevent the ascent of the females of both species.

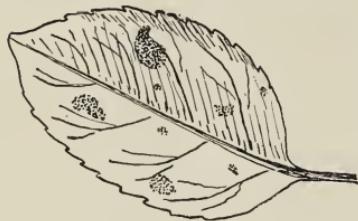
REMEDY.—Where banding has been neglected and the insects appear in injurious numbers, spray thoroughly with Bowker's Pyrox. This gives prompt results.

## The Tent Caterpillar (*Clisiocampa americana*).

A very common insect infesting apple and wild cherry trees, often completely stripping the foliage from a part or the whole of a tree. The larvæ, hatching from the over-wintered eggs in early spring, soon make an unsightly nest, which they enlarge as they grow. When the hairy caterpillars mature, they seek a sheltered locality to spin their cocoons and pupate. From fourteen to twenty-one days later the insects emerge as reddish-brown or fox-colored moths, and the females lay their cylindrical cluster of eggs on the smaller twigs.

REMEDY.—Spray with Bowker's Pyrox as soon as the webs are discovered.

## Apple Scab (*Fusicladium dendriticum*).



This is the most common disease affecting the apple, and may be detected frequently in the spring by the smoky, greenish and circular spots upon the leaves. As they grow older the spots become almost black. The reproducing bodies of the fungus occur in immense numbers upon leaves and fruit, especially in cold, wet weather, causing much damage. The fungus passes the winter on the bark, on fallen leaves and on stored fruit. The disease

starts again as soon as warm weather returns.

REMEDY.—Spray with Bowker's Pyrox before the leaves start, and repeat at intervals of two or three weeks until the fruit is half grown.

## Bark Lice (*Mytilaspis pomorum* : *Chionaspis furfurus*).

These two species are the ones most commonly found on apple, pear and other fruit trees. In winter the scales cover large numbers of tiny eggs, from which young lice develop in the spring. These lice are active for a few days, then fix themselves on the bark and secrete scales. These insects feed on the sap by means of slender beaks, and when abundant, check the growth of the tree.

REMEDIES.—Wash the infested trees in the winter with Bowker's Tree Soap, using one pound to one gallon of water.

Spray with Bowker's Insect Emulsion late in May or whenever the eggs are found to be hatching. Repeat this spraying at the end of one week.

## San Jose Scale.

REMEDIES.—Same as for stone fruits.

## Apple Tree Borers (*Saperda candida* : *Chrysobothris femorata*).

Two species of borers frequently infest apple trees. The round-headed borer usually attacks the tree near the ground, and is the more injurious species. The flat-headed borer works in the trunk and lower branches and sometimes causes considerable damage.

PREVENTIVE.—Wash the tree trunks with Bowker's Carbolized Wash at intervals of two or three weeks in June, July and August. Dilute the wash as directed and apply thoroughly to the trunk and lower branches.

REMEDY.—Dig out borers already in the tree, or crush them in their burrows by using flexible steel wires.

## General Treatment for the Apple.

Keep the trees in thrifty condition by cultivation, pruning and the use of the Stockbridges Tree Manure. Then spray thoroughly with Bowker's Pyrox as follows:

*First Spraying.* During the first warm days of spring, before the buds start, use Bowker's Pyrox, ten pounds to sixty gallons of water.

*Second Spraying.* Just before the blossoms open, apply Bowker's Pyrox, same as first spraying.

*Third Spraying.* Just after blossoms fall, apply Bowker's Pyrox, same as first spraying.

*Fourth Spraying.* Just before apples turn down, apply Bowker's Pyrox, same as first spraying.

*Fifth and Sixth Treatments* with Pyrox at intervals of about two weeks sometimes may be necessary if wet weather prevails.

This treatment will control bud moth, scab, mildew, canker worm, codling moth, tent caterpillar, etc.

For borers, wash the tree trunks with Bowker's Carbolized Wash, one gallon to eight gallons of water. Apply at intervals of two weeks in June, July and August.

## THE PEAR.

### **The Pear Leaf Blight** (*Entomosporium maculatum*).

This disease is probably the most destructive of any attacking the pear. It first manifests its presence in the spring by causing small reddish spots on the surface of the leaves. These spots enlarge and grow darker and soon include the greater part of the leaf. The fruit is next attacked and reddish elevations appear on its surface. These spots run together, grow darker and the fruit soon cracks open and becomes unsalable.

REMEDY.—Spray with Bowker's Pyrox as soon as the leaves unfold. Repeat this treatment at intervals of two weeks, until the fruit is about one half grown.

### **The Pear Slug** (*Eriocampoides limacina*).

These slimy insects feed on the foliage of the pear and cherry and frequently cause severe injury. The adult insect is a small, shining, black, four-winged fly which lays eggs in the leaves in the spring. From these eggs the slimy slugs soon develop, and feed on the surface of the leaves. These insects, when full grown, descend to the ground, transform and emerge in season to lay eggs for a second brood which feeds during August.

REMEDY.—Spray with Bowker's Pyrox as soon as the first brood of the slugs appears.

For the second brood use Bowker's Insect Emulsion as directed.

### **Brown-tail Moth** (*Euproctis chrysorrhœa*).

This insect was probably imported into Massachusetts on some nursery stock from Europe about 1890, and is now generally distributed throughout eastern New England. Pear trees suffer most from the caterpillars of this moth and are often entirely defoliated. The caterpillars mature about June 1, and pupate singly or in clusters in loose cocoons on fences, house walls, etc. The white-winged moths emerge about July 10, and the females lay their eggs in clusters on the underside of the leaves. The eggs hatch about August 1, and the young larvæ feed at the tips of the twigs, drawing the leaves together to form a tight "winter web." They emerge from the webs in the spring and attack the foliage.

PREVENTIVE.—Cut off and burn the webs in winter.

REMEDY.—If the regular spraying with Bowker's Pyrox has been omitted, spray with Bowker's Disparene as soon as the caterpillars appear.

### **Codling Moth.**

REMEDY.—Same as for the apple.

### **Scurfy Bark Louse.**

REMEDY.—Same as for the apple.

## San Jose Scale.

REMEDY.—Same as for stone fruits.

## Pear Tree Psylla (Psylla pyricola).

A minute species of true bug supposed to have been imported into Connecticut about 1832. It has now become a well-known enemy to pear trees within the Northern States. The little clear-winged adult insect hibernates in the crevices of the bark, and appears on the first warm days of spring. The female at first lays her eggs on the buds, later on the leaves. The young larvae attach themselves to all parts of the leaves, feeding on the sap. During the larval and active nymph stages large amounts of honey dew are secreted by the insects, which deplete the trees by the vast consumption of sap.

REMEDY.—Spray with Bowker's Tree Soap, one pound to two gallons of water in the winter.

Spray with Bowker's Insect Emulsion as directed, as soon as the leaves have developed.

## The Fruit Tree Bark Beetle (Scolytus rugulosus).

This European insect has been widely distributed throughout the United States by traffic in nursery stock. It attacks pear, cherry, peach, apple, etc. In early spring, from March to May, according to locality, the first small black beetles may be seen boring their way through the outer bark on all parts of the tree, penetrating to the sapwood, where the female constructs her brood chamber in which to lay her eggs. Often the holes are so numerous on the outer bark that the tree looks as if it had been peppered with fine bird shot.

REMEDY.—Destroy all trees that show signs of dying. Protect trunks and larger branches of the thrifty trees with Bowker's Carbolized Wash, applied with a brush as directed, the same as for other borers. Keep the trees growing with a liberal application of mineral fertilizer.

Spraying the twigs and smaller branches with Bowker's Pyrox is also recommended at time of spraying for the scab.

## General Treatment for the Pear.

*Winter Treatment.* Wash trees with Bowker's Tree Soap, one pound to two gallons of water.

*First Spraying.* Apply Bowker's Pyrox at the rate of ten pounds to sixty gallons of water before the buds swell.

*Second Spraying.* Same as first spraying, just before the blossoms open.

*Third Spraying.* Same as first spraying, just after blossoms fall. Add one gallon Bowker's Insect Emulsion to each twenty gallons of spraying mixture well stirred in.

*Fourth Spraying.* Same as first spraying, when pears are one third grown.

This treatment will control bud moth, brown-tail moth, pear psylla, pear slug, pear blight and cracking of fruit.

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## STONE FRUITS.

### San Jose Scale (Aspidiotus perniciosus).

The most destructive fruit tree pest that has ever found its way into America. It was first introduced into California, probably from Japan. It has been generally distributed over the country on nursery stock. The scale is found in great numbers infesting orchard trees, covering the smaller branches and twigs, and even extending to the leaves and fruit. These insects destroy the trees by feeding on the sap. The larvae are active for a few hours only, when they become attached to the bark by their mouth parts. After reaching the adult stage the minute males emerge with wings and move about,

but the females are wingless and always remain attached in the same position. There are a number of broods each year, and the insects hibernate in all stages. During the active larval stage they are carried from tree to tree by birds and by ants and other insects.

REMEDY.—Dig and completely destroy with fire all trees that are beyond recovery. Drench the remaining infested trees with a solution of Bowker's Tree Soap, at the rate of two pounds to one gallon of water. Treatment may be made in autumn after the leaves have fallen, but it is better to delay the applications until February or March. Two drenchings insure greater success. Trees in bearing should not be treated until the buds commence to swell. The hydrocyanic gas treatment is valuable for nursery stock and under some conditions for orchard trees.

Send for our free treatise on the San Jose Scale.

### **Peach Tree Borer (Sannina exitiosa).**

This American insect is found attacking peach trees wherever they are grown. Its presence is easily discovered by the dark, gummy exudations around the base of the infested tree. The adult insect is a very slender, dark-colored moth, which emerges between May and July, and sometimes even later. The female deposits her eggs on the bark, near the surface of the ground, at the base of the tree, rarely as high as the larger branches. When the egg hatches, the grub burrows in between the bark and sapwood, passing the winter in a dormant state, but continues its eating in the spring until it is full grown. At maturity the larva transforms to a pupa, and emerges shortly after as a moth.

REMEDY.—Prevent the female moth from laying eggs on the bark at the base of the tree by applying Bowker's Carbolized Wash as directed, from below the surface of the soil to the larger branches.

With a sharp knife cut out the borers already in the tree.

### **Peach Leaf Curl (Taphrina deformans).**

This disease of peach foliage makes its attack early in the spring. The leaves thicken, become discolored and in a short time fall from the trees. The trees are left partly or wholly bare and the fruit soon falls.

REMEDY.—Spray with Bowker's Pyrox, ten pounds to one hundred gallons water, just before the flower buds open. Repeat the spraying at intervals of about ten days until danger from the curl is past. It is well to apply at the same time some highly nitrogenous fertilizer, such as Bowker's Fertilizer for young trees.

### **Plum Curculio (Conotrachelus nenuphar).**

One of the snout beetles, a native insect, about one fifth of an inch long, grayish brown or black in color. The adult beetle passes the winter under rubbish, appearing in the spring, and attacks the crop of plums or cherries about the time that the fruit sets. The female makes an incision in the small green plums when depositing her eggs. The larvæ, when hatched, eat their way into the fruit, causing it to drop about the time they mature. Leaving the cherry or plum, they enter the ground to pupate, and emerge later as mature beetles. The curculio is known to attack other stone fruits.

REMEDY.—Spray with Bowker's Pyrox about ten days after the blossoms fall, or as soon as the beetles are noticed.

Jar the beetles from the trees on to sheets by striking the trees with a cloth-bound mallet. The insects should be collected and burned.

### **The Brown Rot (Monilia fructigena).**

This is one of the worst enemies of the plum and other stone fruits. Plums attacked by this disease first turn brown in spots, then rot, and gradually shrivel up. These dried-up plums hang on the trees during the winter and serve as sources of infection the following year.

PREVENTIVE.—Pick off and burn the dead plums during the winter.

REMEDY.—Spray with Bowker's Pyrox before buds open as per directions. This treatment applies to the Brown Rot of the peach, cherry and apricot.

## **Black Knot** (*Plowrightia morbosa*).

The black knot is a well-known disease attacking the plum and many varieties of the cherry. It cannot be mistaken, as the knotty excrescences are readily seen on the twigs and smaller branches.

The first appearance of the knot in the spring causes a swelling of the twig or branch. Soon the bark cracks longitudinally, and the fungus appears as a green velvety coating, which produces the summer spores. These and winter spores, produced later, are carried by the wind to the twigs and branches of other trees.

**PREVENTIVE.**—Cut off and burn all knots as fast as they appear. Coat the wounds with linseed oil.

**REMEDY.**—Spray with Bowker's Pyrox before the buds start.

## **The Cherry or Plum Leaf Blight** (*Cylindrosporium padi*).

This fungus affects the cherry and plum. It attacks the leaves in the late spring or early summer and causes them to drop. It is first noticed as a pale reddish spot on the upper surface of the leaf. These spots sometimes cluster and ultimately form one large spot. Later the spots turn brown, the leaves turn yellow and fall from the tree. The immature fruit drops in the course of a few weeks.

**REMEDY.**—For curculio and leaf blight spray with Bowker's Pyrox directly after the blossoms fall, and again at intervals of about ten days or two weeks.

**CAUTION.**—Guard against spraying the plum or cherry too late in the season, thus avoiding the possibility of any mixture remaining on the ripe fruit. For late spraying use Bowker's A. C. C. mixture.

## **Cherry Aphis, Peach Aphis, etc.**

Cherry and peach trees are frequently infested by large numbers of aphids or plant lice, which cluster under the leaves and cause them to curl. The sticky honey dew falling from these insects smears the leaves and they soon become dark and covered with dirt. Often the growth of the tree is seriously checked.

**REMEDY.**—Wash the trees in winter with Bowker's Tree Soap, one pound to one gallon of water.

As soon as the leaves develop in the spring, spray with Bowker's Insect Emulsion as directed.

## **General Treatment for Stone Fruits.**

Stone fruits especially require thorough care and abundant food. Vigorously growing trees are less susceptible to injury by diseases and insects than stunted, poorly fed trees. Liberal applications of Bowker's Tree Manure, Stockbridge Brand, are therefore advised, together with thorough cultivation and suitable pruning.

*Winter Treatment.* Trees infested with San Jose Scale should be washed with Bowker's Tree Soap, two pounds to one gallon of water, while the buds are swelling. Other trees should be sprayed with the soap at the rate of one pound to two gallons of water, to destroy eggs of aphids.

*First Spraying.* Apply Bowker's Pyrox, ten pounds to sixty gallons of water, before the buds open.

*Second Spraying.* Apply Bowker's Pyrox, ten pounds to one hundred gallons of water, just after blossoms fall.

*Third Spraying.* Ten days after blossoms fall, apply Bowker's Pyrox as in second spraying. (Bowker's Insect Emulsion may be added to destroy aphids.)

*Fourth Spraying.* Same as second spraying, ten days later.

**CAUTION.**—Do not apply Pyrox after the fruit is two thirds grown. If blight or rot prevails at this time, use Bowker's A. C. C. Mixture.

For Borers, use Bowker's Carbolized Wash, one gallon to eight gallons of water, applied to the trunks at intervals of two weeks in May, June and July.

## SMALL FRUITS.

### Downy Mildew of Grape (*Pernospora viticola*).

This disease attacks the leaves, young shoots and fruit of the grape. On the leaves it produces the well-known "downy" growth characteristic of the disease. The berries are next attacked, their growth is checked and they soon fall from the vines. The larger fruit, when affected, is discolored and turns brown. This disease spreads rapidly by means of summer spores.

REMEDY.—Spray thoroughly with Bowker's Pyrox as directed.

### Black Rot of Grape (*Laestadia bidwellii*).

This is the most important disease of the grape. It develops rapidly in damp, hot weather. The first indications of the disease are the development of small, light brown spots on the berries. These spots enlarge, turn black and the entire berry becomes rotten. The affected berries then shrivel and dry up.

REMEDY.—Spray with Bowker's Pyrox as directed.

### Grape Root Worm (*Fidia viticida*).

This insect in its immature state feeds on the roots of the grape and causes much damage. Having transformed in the ground into mature beetles, the insects emerge and attack the foliage, causing serious injury. In Ohio and New York, it has recently become a serious pest, but has yielded to spraying with Bowker's Disparene.

REMEDY.—Spray with Bowker's Disparene as directed.

### Treatment for the Grape.

*First Spraying.* Apply Bowker's Pyrox when the buds begin to swell, using ten pounds to sixty gallons of water.

*Second Spraying.* Same as first spraying, two weeks later.

*Third Spraying.* Same as first spraying, one week before the vines blossom.

*Fourth Spraying.* Same as first spraying, as soon as berries are set.

*Fifth Spraying.* Same as first spraying, three weeks after preceding spraying.

If subsequent sprayings are necessary, use Bowker's A. C. C. Solution.

For Grape Root Worm, apply Bowker's Disparene, five to ten pounds to one hundred gallons of water, between June 15 and July 15, when the insects are most numerous.

### Currant Worms (*Nematus ribesii*).

These insects are the young of a four-winged fly which lays its eggs on the underside of the leaves early in the spring. The currant worms devour the foliage greedily, and when full grown transform in the ground and give rise to a second brood, which attacks the foliage later in the season.

REMEDY.—For first brood apply Bowker's Pyrox, ten pounds to sixty gallons of water.

For second brood, apply Bowker's Insect Emulsion, one part to twenty of water.

### Currant Aphis (*Myzus ribis*).

These aphids develop in great numbers in the early summer, gathering on the under surface of the leaves and causing them to curl. The insects are difficult to combat after they become numerous, but if taken in time their inroads may be checked.

REMEDY.—Spray with Bowker's Insect Emulsion, one part to twenty of water, as soon as the leaves develop.

## Strawberry Leaf Blight (*Sphaerella fragariæ*).

This disease causes the purple or reddish spots common on strawberry leaves. Under favorable conditions of warmth and dampness, the disease spreads and involves the whole leaf. In severe attacks, the plants turn brown and die. Others have their vitality weakened and small crops result.

REMEDY.—Spray with Bowker's Pyrox, ten pounds to sixty gallons, as soon as the leaves develop in the spring. Repeat the spraying just before the blossoms open and again after the crop is gathered.

## Cranberry Vine Worm (*Rhopobota vacciniana*).

Also known as the "Fire Worm." These insects hatch from minute eggs laid on the underside of the leaves the previous year. The young vine worms feed at the tips of the growing shoots, drawing the leaves together with a silken thread. When mature, the insects descend to the ground and later transform into small moths, which lay eggs for the second brood. This brood is the most injurious and its ravages are well likened to a fire sweeping over the bog. The second brood transforms in late summer and leaves eggs which hibernate.

REMEDY.—This insect is easily controlled by thorough spraying with Bowker's Disparene, five or six pounds to fifty gallons of water, applied about May 10 or 15 according to season and locality. This treatment destroys the first brood and will often suffice. Where spraying has been neglected, or the second brood appears in injurious numbers, spray promptly as for first brood. Many growers spray several times during the season.

## Cranberry Span Worms.

Several species of span worms frequently attack cranberry bogs and cause great damage. These insects are easily destroyed by spraying with Bowker's Disparene, as directed in the case of the vine worm.

Disparene may be safely applied to the bogs at any strength and at any time.

## Cranberry Rot.

This disease is not fully understood at present. On many bogs, large areas will be found in which nearly all the berries are rotten. This rotting has never been known to occur where Stockbridge Manure for Old Bogs has been used, and recent investigations by the New Jersey Experiment Station show that the disease is caused by insufficient amounts of potash and phosphoric acid in the soil. The remedy in this case is therefore to feed the vines with this fertilizer (ammonia, two per cent; potash, eight per cent; phosphoric acid, ten per cent); and to spray with Bowker's Bodo after the berries have set.

# THE POTATO.

## The Colorado Potato Beetle (*Doryphora decemlineata*).

This common enemy of the potato was first known in the Rocky Mountain region, where previous to 1860 it was found to feed only upon a worthless plant of the potato family. When the cultivated potato began to be grown in Colorado and vicinity, this insect readily adopted it as a new food plant, and between 1860 and 1875 had spread over the entire country eastward. The adult beetle is so familiar to every one that it needs no description. The orange-colored eggs are usually laid in clusters on the underside of the potato leaves, ranging in number from twelve to fifty. In about a week the eggs hatch into

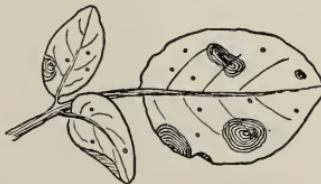
slugs, which mature in a few weeks and pupate just beneath the surface soil. The perfect beetles emerge about ten days later. The species is exceedingly prolific. The female insect is capable of laying more than one thousand eggs during her lifetime, and from two to four broods are produced annually. The beetles hibernate in sheltered places.

### Flea Beetle (*Epitrix cucumeris*).

This insect is a tiny black beetle which jumps actively when disturbed. The beetles eat minute holes through the leaves, and where abundant cause the tops to turn brown and die. The beetles are most abundant in hot, dry seasons.

### Early Blight (*Macrosporium solani*).

This disease is distinct from the more deadly "late blight," but causes serious injury to the potato crop. It develops in early summer in brown, circular spots on the leaves. These spots soon unite, and the leaf dies. Since the tops die prematurely, the tubers are small but usually sound. This disease is closely associated with flea beetle attacks, the punctures made by the beetles often being the starting points of the disease.



### Late Blight (*Phytophthora infestans*).

This deadly disease of the potato is said to have originated in South America. It is now prevalent in nearly all regions where potatoes are grown. It spreads rapidly in warm, moist weather and in a single night often kills the tops throughout large areas. The leaves are first attacked and turn brown in spots. Next the leaf stems and then the stalks are affected and die. The disease soon spreads to the tubers which become rotten and fetid. Promising crops are often ruined by this disease, and yet few fungous diseases may be more readily controlled.

### Potato Scab (*Oospora scabies*).

This is a true fungous disease infesting the surface of potatoes, rendering them unsightly and more or less unsalable. It is most prevalent in fields where stable manure is used.



## General Treatment for the Potato.

Use commercial fertilizers only. Plant sound seed, soaking it for two hours in a solution of one half pint Bowker's Formalin mixed with fifteen gallons of water. This will prevent damage by scab.

*First Spraying.* When tops are six inches high apply Bowker's Boxal, ten pounds to fifty gallons of water.

*Second, third and fourth sprayings*, same as first spraying, at intervals of ten days. If blight is prevalent in the vicinity, keep the tops well coated with Boxal.

Many Aroostook, Maine, potato growers have used large quantities of Bowker's Bodo with great success in preventing damage by blight. Three sprayings with Bodo, ten to twenty pounds to fifty gallons of water, have given excellent results.

To destroy slugs and beetles only, apply Bowker's Boston White to the vines early in the morning.

# VEGETABLES AND FLOWERS.

## Common Asparagus Beetle (Crioceris asparagi).

A European insect which does serious damage to marketable asparagus. The beetles make their appearance in the spring and eat off a portion of the asparagus tips as they appear above the surface of the ground. The beetles hibernate in sheltered places and in early spring begin laying their eggs on the asparagus. The resulting green, slimy slugs feed on the asparagus, drop to the ground and pupate, afterward emerging as beetles. There are several annual broods.

REMEDY.—Destroy all volunteer growth during the cutting season, and if injury is threatened after the cutting season is past, use a very fine spray of Bowker's Pyrox at the rate of ten pounds to sixty gallons of water. It is important either to spray or destroy all asparagus growing in fence corners or by the roadside. Newly set beds should be frequently sprayed.

## Cabbage Worms.

Most cabbage worms are green in color and are not easily seen on the cabbage leaves. The common white butterfly (*Pieris rapæ*) is the most plentiful species. It lays its eggs on the cabbages throughout the whole growing season. All cabbage worms, however, are controlled in the same manner.

REMEDY.—Spray with Bowker's Insect Emulsion, one part to twenty of water. Repeat the remedy as often as occasion requires.

## Striped Cucumber Beetle (Diabrotica vittata).

This insect is generally distributed throughout the United States. It hibernates and appears in April or May according to locality. The adult beetles are very destructive to young cucumbers, squash and melon plants. The beetle is distinguished by its black head and by three black longitudinal stripes. The eggs are laid on the stalks of the host plant near the ground, and the larvæ burrow within the stalks and roots. The presence of these larvæ at the roots is frequently the unsuspected cause of the withering and drying up of the vines.

REMEDY.—Dust the young plants with Bowker's Tobacco Refuse Powder at the first appearance of the insects.

After harvesting the crop, burn all vines except a few scattered over the field, and spray them with a strong solution of Bowker's Disparene.

Saturate the soil about the roots of the infested plants with Bowker's Insect Emulsion, one part to twelve of water. This will kill the larvæ at the roots.

## Cut Worms.

Short, thick-bodied, usually slate-colored worms, of which there are many common species. The worms are the progeny of a host of night-flying moths. The worms are nocturnal in their habits, committing their depredations upon field and garden crops at night and burrowing in the surface soil during the day.

REMEDY.—Before planting a crop, distribute over the ploughed fields at intervals a poison bait consisting of a handful of fresh green forage plants previously immersed in a strong solution of Bowker's Arsenic Lime.

When a ploughed field is to be treated, a wagon load of poison bait may be quickly prepared by spraying a small grass or clover plot with the poison mixture and mowing the area with a scythe.

## White Grub (Lachnosterna fusca).

These grubs are the young of the May beetle and are often injurious to potatoes as well as to lawns and grass land.

REMEDY.—Apply large quantities of Bowker's Insect Emulsion, diluted one part to twelve of water, directly to the infested soil.

Plough and harrow the infested fields late in the fall.

## **Asparagus Rust (Puccinia Asparagi).**

This destructive rust appears in July and August, and causes red blisters on the surface of the vines. The affected fields soon turn brown. The injury by the rust shows not only in the growing vines, but in a reduced crop the following year.

REMEDY.—Spray thoroughly with Bowker's Pyrox at intervals of one week, commencing when the vines are one and one-half feet tall. Use a fine nozzle and thoroughly treat the vines.

## **Melon Blight, Cucumber Mildew, etc. (Plasmopara cubensis).**

This disease attacks melons, cucumbers, squash, etc. The affected leaves turn yellow (sometimes purplish), then brown, dry up, and the crop is ruined.

REMEDY.—Spray thoroughly with Bowker's Bodo, commencing when the vines are six inches tall and repeating at intervals of one week until the fruit commences to ripen.

**IMPORTANT.**—Be sure and spray the under surface of the leaves. Keep the vines thrifty by small applications of Stockbridge Vine Manure, applied at intervals of two weeks.

## **Rose Mildew (Sphaerotheca pannosa).**

This white mildew attacks the leaves of roses, both in greenhouses and out of doors. The leaves become dwarfed, curl downward, and the growth of the plant ceases.

REMEDY.—Spray with Bowker's Bodo as soon as the first symptoms of the disease are noticed. Repeat in ten days if necessary.

## **Rose Bud Worm.**

This insect first rolls or ties the rose leaves, and later bores into the buds and ruins the blossoms. It is often as injurious out of doors as in greenhouses.

REMEDY.—Spray thoroughly with Bowker's Disparene as soon as the first insects are noticed on the leaves.

## **Rose Slug (Monostegia rosæ).**

The soft, slimy slugs which attack the leaves of the rose in midsummer often cause severe damage.

REMEDY.—Spray with Bowker's Disparene as soon as the insects are noticed.

## **Rose Aphids.**

The minute green aphids' or plant lice, which attack rose buds and stems often cause severe injury. These insects cluster in great numbers on the growing shoots, and check development of blossoms. The parent lice give birth to large numbers of young, and in a few weeks will thoroughly infest the largest bushes.

REMEDY.—Spray thoroughly with Bowker's Insect Emulsion, one part to fifteen of water, as soon as the first aphids are noticed. Repeat, if necessary, in the course of one week.

## **Aster Blight (Coleosporium Sonchi-arvensis).**

This disease first attacks the lower leaves of the aster and spreads upward. It produces yellow pustules on the under surface of the foliage, and the affected plants soon weaken and die.

REMEDY.—Spray thoroughly with Bowker's Bodo early in the season, as soon as the plants are six inches high, and repeat at intervals of ten days until the blossoms appear.

## Plant Lice.

There are numerous species of these minute insects, all having very similar habits. The mouth parts are adapted to sucking the juice of plants and not for chewing the tissue. These insects vary in color from light green to black. In warm weather they give birth to innumerable young. Toward autumn most species deposit eggs which hatch the following spring.

REMEDY.—Spray with Bowker's Insect Emulsion, one part to twenty of water, whenever the insects are numerous.

## Red Spider (*Tetranychus telarius*).

This is a very troublesome pest to florists, since it feeds on the sap contained in the foliage of many flowering plants, causing leaves to turn yellow and drop off. These little reddish spiders live and multiply on the underside of the leaves, where they spin a fine silken web. One may often find the nearly colorless eggs associated with a whole colony of individuals in different stages of development.

REMEDY.—Same as for plant lice.

## Mealy Bugs: Scale Insects.

The former receives the name of mealy bug on account of the yellowish-white floury secretions distributed along the sides of the body. Many species of greenhouse plants, like the oleander and orange, are frequently infested with species of scale insects which destroy the vitality of the plants. These insects belong to the same family as mealy bugs, possessing similar habits and life history.

REMEDY.—Same as for plant lice.

Greenhouse plants should be occasionally treated with Bowker's Tobacco Extract.

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# SHADE AND FOREST TREES.

## Elm-leaf Beetle (*Galerucella luteola*).

This European pest is thought to have been imported into the city of Baltimore, Md., about the year 1837. It has spread northward as far as New England and southward into the Carolinas, but its distribution westward is more restricted. The mature beetle somewhat resembles the striped cucumber beetle. It hibernates under boards and in crevices of buildings, etc., appearing in spring as soon as the elm puts forth its leaves. After feeding on the foliage for a short time the beetles lay their eggs on the underside of the elm leaves. The eggs hatching give rise to slugs, or larvæ, that feed on the under surface of the leaves. When mature most of the larvæ descend to the base of the tree to transform, where they may sometimes be gathered by the thousand.

## The Tussock Moth (*Orgyia leucostigma*).

This is a North American insect, ranging from Nova Scotia to Florida and probably westward beyond Iowa. It attacks nearly all kinds of fruit and shade trees except pines. In early spring the young larvæ, hatched from the overwintered egg masses, begin to feed on the underside of the leaves; as they grow toward maturity they consume the entire leaf except the woody midribs and larger veins. The yellow cocoons are usually spun on the trunk and larger branches of the tree. The pupa state lasts from ten to fourteen days, when the adults emerge. The wingless female and the winged male soon mate, and the former begins laying her egg masses on the outside of the abandoned cocoon. Within the range of territory occupied by this insect from one to three broods may be expected in a year.

## Fall Web Worm (*Hyphantria cunea*).

This insect is occasionally destructive to fruit and shade trees, particularly the apple, pear, elm and ash. The adult insect is a moth with white wings, and measures about an inch from tip to tip. The female moth lays her eggs upon the leaves in June. When the eggs hatch, the hairy larvæ somewhat resemble tent caterpillars, but may be distinguished from the latter because they feed within the web, while the tent caterpillars always feed without. In the South the web worm is more destructive, since a second brood develops in August and September.

## Forest Tent Caterpillar (*Clisiocampa disstria*).

This insect resembles the orchard species, with the exception that the larvæ do not make a tent. The yellowish-brown parent moth lays her eggs in a cylindrical band on the twigs of the chosen food plant. The eggs hatch in early spring, and the young larvæ are very hardy. When full grown the caterpillars are sparingly covered with hair and have a row of white spots extending along the back. The mature larvæ spin cocoons in sheltered places and pupate. The moths emerge in early summer. These caterpillars are often very injurious to orchard, shade and forest trees.

## The Gypsy Moth (*Porthetria dispar*).

A notorious pest imported from Europe into Massachusetts in the year 1869. It devours the foliage of all species of plants. The insect passes the winter in the egg state. The eggs are grouped in clusters of three to five hundred each and are found adhering to the bark of trees, stone walls, ledges, etc. The eggs usually hatch the latter part of April or the first of May, and the larvæ mature about the middle of July. The full-grown hairy caterpillars measure two inches in length. They pass their transformations in any sheltered locality, emerging as perfect moths two or three weeks later. The white-winged female is much larger than the male and cannot fly, although she has fully developed wings. The males are darker colored, and are active flyers. The insect is single-brooded, and the eggs are laid in August.

## General Treatment for Shade Tree Insects.

For tussock moth, web worm, forest tent caterpillar and gypsy moth, spray thoroughly with Bowker's Disparene, four pounds to fifty gallons of water, whenever the caterpillars are numerous.

For elm-leaf beetle spray the foliage thoroughly with Bowker's Disparene, six pounds to fifty gallons of water, as soon as the leaves develop. A second spraying may be necessary during the larval season. Be sure to spray the under surface of the leaves. Destroy the larvæ clustering on bark and at base of trees with Bowker's Insect Emulsion.

*Important.* In combating the elm-leaf beetle, brown-tail moth, or gypsy moth it is important to spray heavily as soon as the insects are discovered feeding. Use a fine nozzle, spray on a drying day, and see that all parts of the tree are thoroughly treated.

# BOWKER'S SPRAYING CALENDAR.

(The letters at the left indicate the kind and strength of solution required.)

<b>A</b>	<b>10 lbs.</b>	<b>Bowker's Pyrox</b>	<b>diluted with 60 gals. water.</b>
<b>B</b>	<b>10 "</b>	<b>"</b>	<b>" 100 "</b>
<b>C</b>	<b>10 "</b>	<b>" Boxal</b>	<b>" 50 "</b>
<b>D</b>	<b>10 "</b>	<b>" Bodo</b>	<b>" 25 "</b>
<b>E</b>	<b>5 "</b>	<b>" Disparene</b>	<b>" 50 "</b>
<b>F</b>	<b>1 lb.</b>	<b>" Tree Soap</b>	<b>1 gal.</b>
<b>G</b>	<b>2 lbs.</b>	<b>" "</b>	<b>1 "</b>
<b>H</b>	<b>1 pint</b>	<b>" A. C. C. Mixture</b>	<b>20 gals.</b>
<b>I</b>	<b>1 gal.</b>	<b>" Insect Emulsion</b>	<b>20 "</b>
<b>J</b>	<b>1 "</b>	<b>" Carbolized Wash</b>	<b>8 "</b>

## FRUITS.

### Apple.

April 20 to June 25.\*

FOR CODLING MOTH, BUD MOTH, CANKER WORMS, TENT CATERPILLAR, APPLE SCAB.

First Spraying. Apply **A** before buds start.

Second Spraying. Apply **A** just before blossoms open.

Third Spraying. Apply **A** just after blossoms fall.

Fourth Spraying. Apply **A** just before apples turn down.

Fifth and Sixth Sprayings with **A** at intervals of two weeks if necessary.

FOR BORERS. Apply **J** at intervals of two weeks in June, July and August.

FOR BARK LICE. Apply **F** in winter and **I** in May or June.

### Pear.

April to June 20.\*

FOR SCAB, LEAF BLIGHT, PSYLLA, SLUG, CODLING MOTH, BROWN-TAIL MOTH.

First Spraying. Apply **A** before buds start.

Second Spraying. Apply **A** just before blossoms open.

Third Spraying. Apply **A** just after blossoms fall, adding one gallon Insect Emulsion to each twenty gallons of spray.

Fourth Spraying. Apply **A** when fruit is one third grown.

FOR BARK BEETLE. Apply **J** as for other borers.

### Stone Fruits.

April 15\* until fruit is two thirds grown.

FOR LEAF CURL, LEAF BLIGHT, BROWN ROT, BLACK KNOT, CURCULIO.

First Spraying. Apply **A** before buds open.

Second Spraying. Apply **B** just after blossoms fall.

Third Spraying. Apply **B** ten days later. Additional sprayings may be made with **H**.

FOR APHIS. Add one gallon Insect Emulsion to each twenty gallons of spraying mixture at third spraying.

FOR SAN JOSE SCALE. Apply **G** in fall, winter or spring.

FOR BORERS. Apply **J** at intervals of two weeks in May, June and July.

FOR DOWNTY MILDEW AND BLACK ROT.

First Spraying. Apply **A** when buds begin to swell.

Second Spraying. Apply **A** two weeks later.

### Grape.

April 20 to August 1.\*

\* These approximate dates answer for New England and the Middle States, but for the Southern States they should be set a little earlier.

## SPRAYING CALENDAR—Continued.

<b>Grape.</b> Apr. 20 to Aug. 1.*	FOR DOWNTY MILDEW AND BLACK ROT—Continued. Third Spraying. Apply <b>A</b> one week before vines bloom. Fourth Spraying. Apply <b>A</b> as soon as the berries have set. Later sprayings may be made with <b>A</b> until fruit is two thirds grown. Later use <b>H</b> .
	FOR GRAPE-ROOT WORM. Apply <b>E</b> between June 15 and July 15.
<b>Cranberry.</b> May 20 to July 15.*	FOR VINE WORM. Apply <b>E</b> as soon as the first insects appear. Repeat for second brood if necessary.
	FOR SPAN WORM AND ALLIED INSECTS. Apply <b>E</b> whenever the insects are noticed.
<b>Currant.</b> May 16 to August 1.*	FOR FIRST BROOD CURRANT WORM. Apply <b>A</b> as soon as the insects are noticed.
	FOR SECOND BROOD CURRANT WORM AND FOR APHIS. Apply <b>I</b> as needed.
<b>Strawberry.</b> April 20 to August 1.*	FOR LEAF BLIGHT. First Spraying. Apply <b>A</b> as soon as leaves develop. Second Spraying. Apply <b>A</b> just before blossoms open. Third Spraying. Apply <b>A</b> after the crop is gathered.

## SHADE TREES, SHRUBS AND FLOWERS.

<b>Shade Trees and Shrubs.</b> May 1 to September 15.*	FOR THE ELM-LEAF BEETLE. Apply <b>E</b> as soon as leaves develop. Repeat during larval season.
	FOR TUSSOCK MOTH, WEB WORM, CANKER WORM, FOREST TENT CATERPILLAR, GYPSY MOTH. Apply <b>E</b> whenever insects are numerous.
<b>Rose.</b>	ROSE WORM OR BUD WORM. Apply <b>E</b> as soon as leaves have developed.
<b>Carnations, Violets. Plants in General.</b>	ROSE LICE, ROSE SLUG. Apply <b>I</b> whenever insects appear. FOR RUST. Apply <b>H</b> at intervals of one week. FOR WHITE GRUE. Apply <b>I</b> to infested soil. FOR CUT WORMS. Treat forage plants with Arsenic Lime and distribute over infested field. FOR PLANT LICE, MEALY BUG, SCALES, RED SPIDER, THRIPS, ETC. Apply <b>I</b> as often as necessary.

## VEGETABLES.

<b>Potato.</b> May 15 to August 15.*	FOR POTATO BEETLE, FLEA BEETLE, EARLY BLIGHT, LATE BLIGHT. First Spraying. Apply <b>C</b> when plants are six inches tall. Second and later sprayings. Apply <b>C</b> at intervals of ten days until tops are grown. For blights only, use <b>D</b> at intervals of ten days.
<b>Tomato.</b> June to September.*	FOR LEAF BLIGHT AND ROT. Apply <b>D</b> as soon as discovered. Repeat at intervals of ten days. Use <b>H</b> during fruiting season.
<b>Asparagus.</b> May to September.*	FOR ASPARAGUS BEETLE AND RUST. Apply <b>A</b> to new beds and to old beds after cutting season.
<b>Cabbage.</b> May 25 to September 10.*	FOR CABBAGE WORMS. Apply <b>I</b> whenever insects are numerous.
<b>Cucumber and Melons.</b>	FOR CUCUMBER BEETLE. Dust plants with Bowker's Tobacco Powder. Apply <b>I</b> to soil at roots of plants. FOR BLIGHT. Apply <b>D</b> at intervals of ten days.

\* These approximate dates answer for New England and the Middle States, but for the Southern States they should be set a little earlier.

**"FOR  
THE LAND'S SAKE"  
USE BOWKER'S FERTILIZERS**

Independent Brands made by an Independent Company  
THEY ENRICH THE EARTH AND THOSE WHO TILL IT

**T**WENTY-NINE years ago the President of the Bowker Company personally manufactured and barrelled up one hundred tons of fertilizer in a little wooden storehouse on Constitution Wharf, in Boston. He then went among the farmers of his own State, neighbors and friends, and sold it.

To-day, under his management, the Company operates three large factories (Boston, New York, and Cincinnati), having a combined capacity of sixty thousand tons.

Nearly four thousand agents are handling the product of these three factories, and, instead of the *one hundred tons a year* which Mr. Bowker originally sold, these agents now sell an average of **nearby two hundred tons a day**.

If the goods had not been excellent of their kind, would this great increase have been possible?

### **GOVERNMENT TESTS**

At the beginning of this business Mr. Bowker adopted as his motto,—

"We state what we sell,  
And sell what we state."

And from the start this motto has been loyally adhered to and the goods have been made and sold on honor.

More than ten thousand government tests have been made of these goods during the past twenty-nine years, showing as a rule that they contained **more** plant food than was stated. As a result it is entirely within bounds to say that they are now used by more than one hundred thousand farmers.

### **AN INDEPENDENT COMPANY**

The Bowker Company is not connected with any other company or combination of companies, but is independent; with independent management and independent factories. It does not seek patronage, however, on that account, but rather on the merit of its goods, as demonstrated by government tests and by the more important tests made in the field by practical farmers everywhere.

*If interested in fertilizers, it will pay you to correspond with us.*

**BOWKER**

**FERTILIZER CO.**

Boston   New York   Cincinnati

Gaylord Bros.  
Makers  
Syracuse, N. Y.  
PAT. JAH. 21, 1908



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